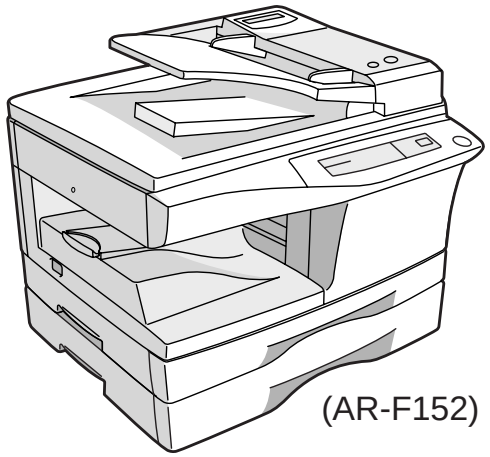
SHARP SERVICE MANUAL

CODE: 00ZARF152/A1E



(AR-F152)

DIGITAL COPIER

MODEL AR-151 AR-156 AR-F152

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Parts marked with "⚠" are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

This document has been published to be used for after sales service only.
The contents are subject to change without notice.

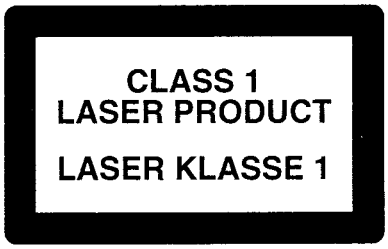
CAUTION

This product is a class 1 laser product that complies with 21CFR 1040.10 and 1040.11 of the CDRH standard and IEC825. This means that this machine does not produce hazardous laser radiation. The use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This laser radiation is not a danger to the skin, but when an exact focusing of the laser beam is achieved on the eye's retina, there is the danger of spot damage to the retina.

The following cautions must be observed to avoid exposure of the laser beam to your eyes at the time of servicing.

1) When a problem in the laser optical unit has occurred, the whole optical unit must be exchanged as a unit, not as individual parts.
2) Do not look into the machine with the main switch turned on after removing the developer unit, toner cartridge, and drum cartridge.
3) Do not look into the laser beam exposure slit of the laser optical unit with the connector connected when removing and installing the optical system.
4) The middle frame contains the safety interlock switch.
   Do not defeat the safety interlock by inserting wedges or other items into the switch slot.



LASER WAVE – LENGTH : 780 ~ 795
Pulse times : 0.481 ms/6 mm
Out put power : 0.20 ± 0.03 mW

CAUTION

INVISIBLE LASER RADIATION,
WHEN OPEN AND INTERLOCKS DEFEATED.
AVOID EXPOSURE TO BEAM.

VORSICHT

UNSICHTBARE LASERSTRAHLUNG,
WENN ABDECKUNG GEÖFFNET UND
SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT.
NICHT DEM STRAHL AUSSETZEN.

VARO !

AVATTAESSA JA SUOJALUKITUS
OHITETTAESSA OLET ALTTIINA
NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE ÄLÄ
KATSO SÄTEESEEN.

ADVARSEL

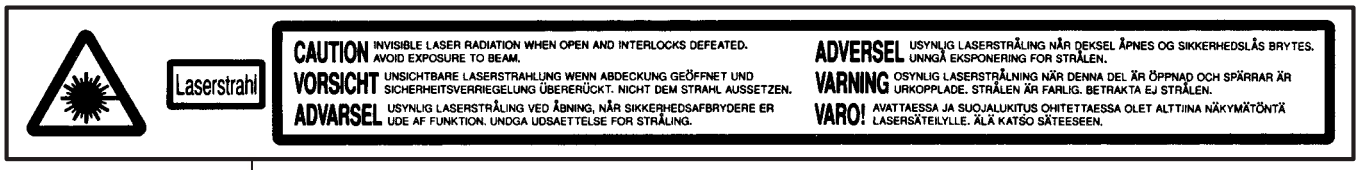
USYNLIG LASERSTRÅLNING VED ÅBNING, NÅR
SIKKERHEDSBRYDERE ER UDE AF
FUNKTION. UNDGÅ UDSAETTELSE FOR
STRÅLNING.

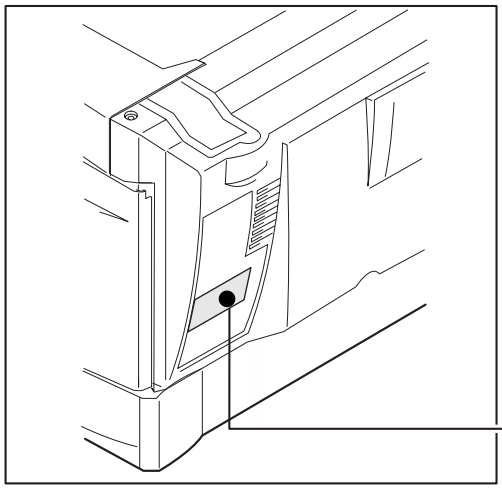
VARNING !

OSYNLIG LASERSTRÅLNING NÄR DENNA DEL
ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD.
BETRAKTA EJ STRÅLEN. – STRÅLEN ÄR FARLIG.

At the production line, the output power of the scanner unit is adjusted to 0.57 MILLI-WATT PLUS 20 PCTS and is maintained constant by the operation of the Automatic Power Control (APC). Even if the APC circuit fails in operation for some reason, the maximum output power will only be 15 MILLI-WATT 0.1 MICRO-SEC. Giving an accessible emission level of 42 MICRO-WATT which is still-less than the limit of CLASS-1 laser product.

Caution
This product contains a low power laser device. To ensure continued safety do not remove any cover or attempt to gain access to the inside of the product. Refer all servicing to qualified personnel.

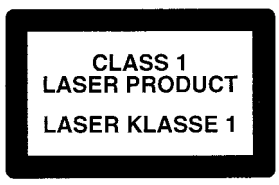

Laserstrahl
CAUTION INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.
VORSICHT UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET UND SICHERHEITSVERRIEGELUNG ÜBERERÜCKT. NICHT DEM STRAHL AUSSETZEN.
ADVARSEL USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGA UDSAETTELSE FOR STRÅLING.
ADVERSEL USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.
VARNING OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRRAR ÄR URKOPPLADE. STRÅLEN ÄR FARLIG. BETRAKTA EJ STRÅLEN.
VARO! AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTÖNTÄ LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.



The foregoing is applicable only to the 220V model, 230V model and 240V model.

VAROITUS! LAITTEEN KÄYTTÄMINEN MUULLA KUIN TÄSSÄ KÄYTTÖOHJEESSA MAINITULLA TAVALLA SAATTAA ALTISTAA KÄYTTÄJÄN TURVALLISUUSLUOKAN 1 YLITTÄVÄLLE NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE.

VARNING - OM APPARATEN ANVÄNDS PÅ ANNAT SÄTT ÄN I DENNA BRUKSANVISNING SPECIFICERATS, KAN ANVÄNDAREN UTSÄTTAS FÖR OSYNLIG LASERSTRÅLNING, SOM ÖVERSKRIDER GRÄNSEN FÖR LASERKLASS 1.



LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

[1] GENERAL

1. AR-151/156/F152 major functions

Item / Model	CPM	SB/MB	2 tray	SPF	R-SPF	FAX	GDI with USB	GDI without USB	SOPM	Duplex
AR-151	15CPM	MB	Opt	∗1 Opt	×	∗1 Opt	Opt	×	○	×
AR-156	15CPM	MB	Opt	×	○	×	Opt	×	○	○
AR-F152	15CPM	MB	∗2 ○	×	×	○	Opt	×	○	×

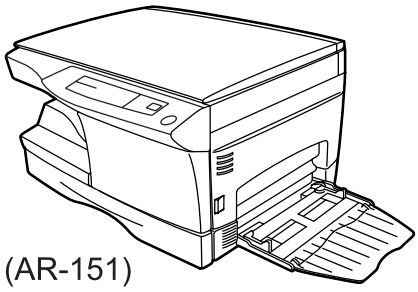
Descriptions of items

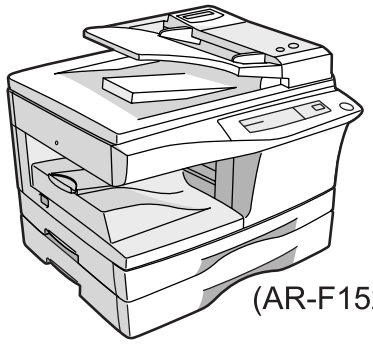
CPM:	Copy speed (Copies Per Minute)
SB/MB:	SB = Manual feed single bypass, MB = Manual feed multi bypass
2 tray:	Second cassette unit. The 1 tray unit (AR-DE9) is optionally available.
SPF:	Original feed unit
R-SPF:	Duplex original feed unit
FAX:	FAX function. The AR-FX3 (FAX-SPF and FAX board) is optionally available.)
GDI with USB:	GDI printer function with USB. The AR-PG1 (GDI + USB kit) is optionally available.
GDI without USB:	GDI printer function without USB. The said model has no option of it.
SOPM:	Scan One Print Many function (Many copies are made by one scan.)
Duplex:	Auto duplex copy function

Descriptions of table

○ : Standard provision
× : No function or no option available
∗1: Incompatible between SPF and FAX function
∗2: 1 tray option for Europe

2. System Configuration


(AR-151)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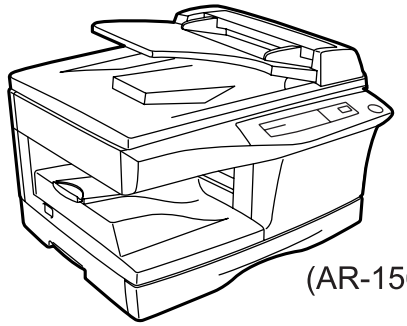
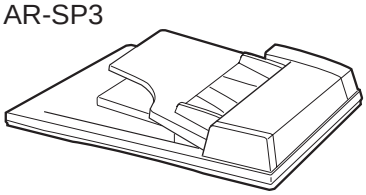
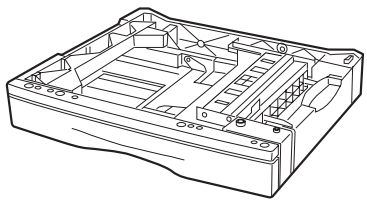

(AR-156)

(Options)

AR-SP3

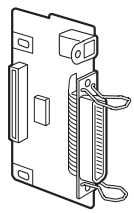


AR-DE9



AR-FX3

AR-PG1



[2] SPECIFICATIONS

1. Basic specifications of copier

A. Basic specifications

Item	Spec.
Type	Desktop
Copy system	Dry, electrostatic
Segment (class)	Digital personal copier
External dimensions (W × D × H) (mm)	AR-151: 518mm × 482.6mm × 292.6mm AR-156: 518mm × 482.6mm × 379mm AR-F152: 518mm × 482.6mm × 465.3mm
Weight	AR-151: Approx. 19Kg, (drum cartridges included) AR-156: Approx. 22Kg, (drum cartridges included) AR-F152: Approx. 25Kg, (drum cartridges included)

B. Operation specification

Section	Item		Details	Spec.
Paper feed section	Paper feed system			AR-151/AR-156: 1 tray (250 sheets) + multi bypass (50 sheets) AR-F152: 2 tray (250 sheets) + multi bypass (50 sheets) (1 tray for Europe)
	AB system	Tray paper feed section	Paper size	A4, B5, A5 (Landscape)
			Paper weight	56 – 80g/m^2
			Paper feed capacity	250 sheets
			Kinds	Standard paper, specified paper, recycled paper
			Remark	User adjustment of paper guide available
		Multi bypass paper feed section	Paper size	A4, B5, A5, B6, A6 (Landscape)
			Paper weight	52 – 128g/m^2
			Paper feed capacity	50 sheets
			Kinds ∗1	Standard paper, specified paper, recycled paper, OHP, Label, Postal card
			Remark	User adjustment of paper guide available
	Inch system	Tray paper feed section	Paper size	8-1/2″ × 14″, 8-1/2 × 11″, 8-1/2″ × 5-1/2″ (Landscape)
			Paper weight	15 – 21 lbs.
			Paper feed capacity	250 sheets
			Kinds	Standard paper, specified paper, recycled paper
			Remark	User adjustment of paper guide available
		Multi bypass paper feed section	Paper size	8-1/2″ × 14″, 8-1/2 × 11″, 8-1/2″ × 5-1/2″, 3-1/2″ × 5-1/2″ (Landscape)
			Paper weight	14 – 34.5 lbs.
			Paper feed capacity	50 sheets
			Kinds ∗1	Standard paper, specified paper, recycled paper, OHP, Label, Postal card
			Remark	User adjustment of paper guide available
Paper for Duplex (AR-156 only)	AB system		Paper size	A4, B5, A5 (Landscape)
			Paper weight	56 – 80 g/m^2
			Kinds	Standard paper, Specified paper, Recycled paper
	Inch system		Paper size	8-1/2″ × 14″, 8-1/2″ × 11″, 8-1/2″ × 5-1/2″ (Landscape)
			Paper weight	15-21 lbs
			Kinds	Standard paper, Specified paper, Recycled paper

∗1: OHP, Label, Postal card: each 1 pc.

Section		Item	Details	Spec.
Paper exit section		Exit way		Face down
		Capacity of output tray		100 sheets
Originals		Original set		Center Registration (left edge)
		Max. original size		B4 (10″ × 14″)
		Original kinds		sheet
		Original size detection		None
Optical section	Scanning section	Scanning system		CCD sensor scanning by lighting lamp scanner
		CCD sensor	Resolution	400 dpi
		Lighting lamp	Type	Xenon lamp
			Voltage	1.5kV
			Power consumption	11 ± 3W
		Gradation		256 gradations/8bit
	Writing section	Writing system		Writing to OPC drum by the semiconductor laser
		Laser unit	Resolution	600 dpi
Image forming		Photoconductor	Type	OPC (30ϕ)
			Life	18k
		Charger	Charging system	Saw -tooth charging with a grid, / (–) scorotron discharge
			Transfer system	(+) DC corotron system
			Separation system	(–) DC corotron system
		Developing	Developing system	Dry, 2-component magnetic brush development system
		Cleaning	Cleaning system	Counter blade system (Counter to rotation)
Fusing section		Fusing system		Heat roller system
		Upper heat roller	Type	Teflon roller
		Lower heat roller	Type	Silicon rubber roller
		Heater lamp	Type	Halogen lamp
			Voltage	100V
			Power consumption	800W
Electrical section		Power source	Voltage	Local AC voltage
			Frequency	Common use for 50 and 60Hz
		Power consumption	Max.	AR-151/AR-156: 1000W, AR-F152: 1000W
			Average (during copying) *1)	AR-151/AR-156: 310Wh/H, AR-F152: 310Wh/H
			Average (stand-by) *1)	AR-151/AR-156: 70Wh/H, AR-F152: 90Wh/H
			Pre-heat mode *1)	AR-151/AR-156: 40Wh/H, AR-F152: 51Wh/H
			Auto power shut-off mode *1)	AR-151/AR-156: 18Wh/H, AR-F152: 23Wh/H

*1) May fluctuate due to environmental conditions and the input voltage.

C. Copy performance

Section	Item	Details	Spec.
Copy magnification	Fixed magnification ratios		3R + 2E (AB system: 50, 70, 81, 100, 141, 200%) (Inch system: 50, 64, 78, 100, 129, 200%)
	Zooming magnification ratios		50 ~ 200% (151 steps in 1% increments)
Manual steps (manual, photo)			5 steps

Section		Item		Details	Spec.
Copy speed		First copy time		Tray paper feed	9.6 sec. or below (A4), 9.4 sec. or below (8-1/2" × 14") (Pre-heat mode: 16 sec. or below / Auto power-shut-off mode: 23 sec. or below)
				Manual paper feed	10.0 sec (Pre-heat mode: 16 sec. or below / Auto power-shut-off mode: 23 sec. or below)
	AB system: A4 (Landscape)	Copy speed (CPM)		Same size	15
				Enlargement	15
				Reduction	15
	B5 (Landscape)	Copy speed (CPM)		Same size	15
				Enlargement	15
				Reduction	15
	Inch system 8-1/2″ × 14″ (Landscape)	Copy speed (CPM)		Same size	12
				Enlargement	12
				Reduction	12
	8-1/2″ × 11″ (Landscape)	Copy speed (CPM)		Same size	15
				Enlargement	15
				Reduction	15
Max. continuous copy quantity					99
Void		Void area		Leading edge	1 ~ 4mm
				Trailing edge	4mm or less, 6mm or less (Duplex copying/both images)
				Side edge void area	4.0mm or less (per side), 4.5mm or less (Duplex copying/both images: per side) machine with side edge void 0.5mm ~ 4mm (Total of both edge voids)
		Image loss	OC mode	Leading edge	Same size: 3.0mm or less / Enlarge (200%): 2.0mm or less / Reduction (50%): 6.0mm or less
			SPF/R-SPF/ Duplex	Leading edge	Same size: 4.0mm or less / Enlarge (200%): 3.0mm or less / Reduction (50%): 8.0mm or less
Warm-up time					0 sec.
Power save mode reset time					0 sec.
Paper jam recovery time					0 sec.

2. Basic specifications of facsimile (AR-F152 only)

Large Item	Middle Item	Small Item	Sub Item	Spec.
Communi-cation system	Transmission method	Transmission time		Approx. 6 sec. (G3 ECM/14,400bps)
		Transmission Method		V17, V29, V27TER, V33 (Only Receiving)
		Compression method		MH, MR, MMR
		Modem speed		14,400bps → 2,400bps automatic fall back
		Mutual transmission		G3
		Line used		Public Switched Telephone Network (PSTN), Private Branch exchange (PBX),
		Number of lines used		1 line (cannot be added)
		ECM		YES
Scanning system	Document size	Max. document width		OC: B4 SPF: B4 (Multi)/ 257 × 500 (Single)
		Unscannable region		Leading edge 1 to 4 mm, trailing edge: 4mm max., left end + right end: either 4mm max.
		Transmitted document size		SPF: Max. 10.1" × 19.7" Min. 8.5" × 5.5"(Inch System) 210 × 148mm (AB system)
		Document size designation		B4, 8-1/2, A4, B5, A5, 5/2
		Two-sided document designation		NO

Large Item	Middle Item	Small Item	Sub Item	Spec.
Scanning system	Document size	Long document		500 mm (Single Feed with hand hold)
Scanning system	Automatic document detection	SPF		YES (Over or Under B4 size)
		OC		NO
	Transmission mode	SPF/OC transmission changeover		NO
	Document loading capacity, scanning cycle (SPF performance)	Continuous, automatic feed compatibility		NO
		Document loading capacity		SPF: 30 sheets
		Document scanning cycle		13 sheets/min. (Standard mode, A4R memory transmission)
Image processing system	Half tone reproduction	Half tone (photo mode)		Equivalent to 256 scales Following functions are not possible in half-Tone mode in B4 size. ● Timer sending ● Memory sending ● Broadcast ● To store the original for memory polling.
			Resolution	8 dot /mm × 7.7 line / mm (Fixed)
	Contrast adjustment	Contrast selection		Manual in 3 stages (AE)
	Resolution selection	Standard		8 dot / mm × 3.85 line / mm
		Fine		8 dot / mm × 7.7 line / mm
		Super fine		8 dot / mm × 15.4 line / mm
		Finest		NO
	Printer section resolution			600dpi
Print system	Printing size	Max. printing width		215.9 mm
		Print paper size detection		YES (Only width): A4/Letter or small size
		Printing size		A4/Letter/Legal
	Print paper	Cassette capacity		250 × 2 (1 tray option for Europe)
		Print paper absence detection		By failing paper pick up
		Exit Paper Tray Full sensor		NO
		Feed		Paper cassette
Trans-mission function system	Easy dialing function	Rapid key dialing		20 other parties
		Speed dialing		100 other parties
		Group dialing		20 groups (including the other parties registered to rapid key dialing)
		Phonebook transmission		By using the SEARCH key: Any other parties registered to speed dialing and rapid key dialing can be searched for using the first letter.
		Chain dialing		YES
		Redialing		The last number dialed is saved
		Program		NO
		Mode recall		NO
	Time designation function	Time specified transmission/polling		Time of day specified for transmission or polling. Max.3

Large Item	Middle Item	Small Item	Sub Item	Spec.
Trans-mission function system	Recall mode	Automatic recall mode when other party is busy	Intervals	1 to 15 minutes
			Count	1 to 14 times/0: no re-transmission
		Recall mode when communication error occurs	Intervals	1 to 15 minutes
			Count	1 to 14 times/0: no re-transmission
			Transmitted Pages	Beginning with the page where error occurred
		Number of transmissions counted in recall mode simultaneously		Max. 20 transmissions
		Subsequent transmission reservation override in recall mode		YES
	Memory Trans-mission/direct transmission	Memory transmission	Memory Transmission	YES
			Number of transmission Reservations that can be made	Max. 20
			Processing when memory is full	Transmission is cancelled when using Timer, Group or Broadcast function. Only scanned' data is transmitted. * The number of pages to be actually sent does not always correspond to the one passing through the SPF in case of communication error. * The transmission is cancelled when communication error occurs.
			Setting change After Transmission Setting	NO
		Direct transmission		YES
		Default setting		By Memory All Clear
	Line sound monitoring function	Dialing confirmation monitoring		YES (Service Man diagnostic.)
	Broadcast function	Broadcast transmission	Number of destinations	50 destinations (Including the Group Dial)
			Transmission method	Broadcast key, group key
			Usable numbers	Rapid or Speed keys
		Group dialing		Transmitted to group registered to rapid keys or speed dial.
	Boadcast function	Relay transmission	Instructing Station	NO
			Relay station	NO
			Multiple relay	NO
			Number of relay groups	NO
			Number of Receiving stations that may be Specified per Group	NO
	Confidential function	Confidential transmission	Other party's Station	NO
	Batch transmission function	Batch transmission		NO

Large Item	Middle Item	Small Item	Sub Item	Spec.
Trans-mission function system	Priority function	Transmission reservation interrupt		NO
		Broadcast interrupt		NO
		Recall mode interrupt		NO
	Multiple message transmission function	Multiple message transmission		NO
	Rotational Transmission	Rotational transmission	Paper size	NO
	Book document transmission	Book document transmission	Transmission method	YES (From OC mode)
			Consecutive page transmission (page splitting)	NO
	OK stamp		OK stamp	NO
	Remote transmission (polling transmission function)	Remote transmission (Memory Polling)	Remote Transmission	YES (From Memory)
		Protective function	Check by other Party's number	NO
			Check by Matching of System number (user's own machine) and ID number (other party's Machine) (between Sharp machines only)	NO
Receiving function system	Receiving mode	Default setting		Automatic receiving (can be switched to A.M mode or manual receiving in key operator program)
		Automatic receiving	Number of calls	0 to 9 times (factory-set to twice: can be changed in key operator program) - The external telephone rings once if set the number of calls for automatic receiving to 0 times.
			Automatic phone/fax switching	NO
		Manual receiving	Manual receiving setting	YES
	Receiving mode	Manual receiving	Number of Switching calls to automatic Receiving in manual receiving mode	OFF/1 to 9 times
		Telephone message receiver connection	Answering Machine mode	YES
			Automatically switch to automatic receive	ON / OFF
			Quiet detect time	OFF/ 1 to 9 sec.
	Receiving mode timer switching			NO

Large Item	Middle Item	Small Item	Sub Item	Spec.
Receiving function system	Variable scale factor receiving	Reduction	Reduction made within Regular size	YES (ON/OFF in key operator program)
			By received data print size Designation	YES
		Enlargement		NO
	Memory receiving function	Substitute receiving into memory	Substitute Receiving into Memory	Only when data cannot be output
			Forced memory receiving	NO
			Received data override Output	NO
	Transfer	Transfer at occurrence of trouble		YES
	Number specified receiving	Receiving of only specified number enabled		NO
		Anti junk fax mode		YES (ON/OFF) 10 group, 20 letters
	Confidential function	Confidential receiving	Sender	NO
			Mailbox	NO
			Mailbox name	NO
			Confidential ID code	NO
	Rotational receiving			NO
	Split receiving	Split size		YES
		Split receiving setting		YES (according to paper selection condition in key operator program)
	Two-sided document receiving			NO
	2-in-1 receiving			NO
	Transmission request (polling receiving function)	Transmission request	Transmission Request	YES
			Resolution at transmission Request	Depends on the Sending Machine.
	Turnaround transmission			NO
Registration system	Number registration	Speed dialing	Number of other parties	100 other parties
			Number of other party's Number digits	20 digits
			Registered name	20 letters (may be omitted)
		Speed dialing	Searched letters	Up to 1 letter
			User tag Classification	NO
			International communication mode setting	NO
			Transmission method	Speed dialing key + (00 to 99) + start key

Large Item	Middle Item	Small Item	Sub Item	Spec.
Registration system	Number registration	Rapid key dialing	Number of other parties	20 other parties
			Number of other party's Number digits	20 digits
			Registered name	20 letters (may be omitted)
			Searched letters	Up to 1 letter
			User tag Classification	NO
			International communication mode setting	NO
			Transmission method	Rapid key dialing
		Group dialing	Registration keys	Rapid keys
			Max. number of registered other parties per group	50 other parties
			Registrable Number	Numbers registered to speed dialing and rapid key dialing.
			Registered name	20 letters (may be omitted)
			Searched letters	NO
			User tag Classification	NO
			Transmission method	Group dialing
		Program	Number of programs	NO
			Registerable item	NO
			Registered name	NO
			Calling method	NO
			Setting change After calling	NO
		Batch	Registration key	NO
			Number of other parties	NO
			Registration method	NO
	Sender Registration	Sender registration	Sender's name	24 letters, registered in key operator program
			Sender's number	20 digits, registered in key operator program
	Transmission request/remote transmission enable number registration	Transmission request enable number	Transmission Request source Number Registration	NO
		System number	System number Registration	NO
		ID number	ID number Registration	NO
	Letter input	Input method	Key input	YES
		Letters that may be input	Characters	Alphanumeric characters, symbols
	Registered data read-out, read-in			NO
	Date & time adjustment			Registered in key operator program Support terms is from 1990 to 2089.
	Date indication change			NO
	Backup	Registered data backup at power failure		SRAM used, built-in battery-backed

Large Item	Middle Item	Small Item	Sub Item	Spec.
Telephone Function System	Handset			NO
	On-hook			YES
	Hold			NO
	Pause			YES (2 second fixed)
	Phone transmission at power failure			NO
	Ringer volume			Adjusted in key operator program
	Speaker volume			Adjusted by pressing arrow keys on the fax control panel
	Tone pulse switching			Switched between 10 pps and TONE in key operator program (North America)
	External telephone connection			YES
		Remote receiving switching		YES (switching number in 1 digit +**) 0 to 9
	Automatic telephone/fax switching			NO
		Audio response		NO
		Response voice recording		NO
Fax Memory	Memory capacity	Standard		2MB (Approx. 120 pages/A4)
		Option		NO
	Memory Back up			Yes Job memory back up: Approx. 1 hour (after min. 6 minutes charge) Configuration Memory back up to 5 years.
	Memory Contents (transmission reservation) confirmation	LCD indication		NO
		Print out		YES
	Memory remain indication			YES (Memory available percent display 3 digits in % on LCD
Additional information printing function for transmission	Page counter			NO
	Date printing			YES (Year: month: day/ year in 4 digits) LCD: 2 digits / Print: 4 digits
		Date indication change		NO
	Cover function	Cover item	Other party's name	YES
			Other party's number	YES
			Sender's name	YES
			Sender's number	YES
			Transmission message	YES
	Transmission message	Regular message		NO MESSAGE/URGENT/ IMPORTANT/CONFIDENTIAL/PLS.DISTRIBUTE/PLS. CALL BACK
		User message		NO
	Sender printing function	Sender's number		20 digits
		Sender's name		24 letters
Additional printing function for receiving	Index printing			YES

Large Item	Middle Item	Small Item	Sub Item	Spec.
Record table system	Communication record function	Communication record table size		A4, LETTER, Legal (not output if size setting is not A4, LETTER, legal or larger)
		Communication record memory capacity		50 communications for transmission/receiving respectively
		Communication record table	Number of communications	50 communications for transmission/receiving respectively
			Time-specified output	YES 5 kinds, Every day, Each 2 day, Each 4 day, Once a week, OFF The print time is fixed at 00:00.
			When recording Memory is full	NO
			Printing sequence	LAST IN LAST OUT
			Department-by-department output	NO
		Time-specified communication table		Common to transmission record table
		Confidential receiving confirmation table		NO
	Communication result report function	Communication result table (transmission)		YES (ALWAYS PRINT, ERROR/ TIMER, SEND ONLY, NEVER PRINT, ERROR ONLY)
		Broadcast transmission report		NO
		Communication result table (receiving)		YES
		Document image printing when memory transmission is not yet made		NO
	Other report/list	Rapid key dialing list		YES (output as telephone number list)
		Speed dialing list		YES (output as telephone number list)
		Group dialing list		YES
		Transmission activity list		YES
		ID/sender list		NO
		Batch transmission confirmation list		NO
		Confidential ID list		NO
		Option setting list		YES
		Telephone list		YES
		Timer list		YES
		Anti junk fax number list		YES
		Receptions activity List		YES
		Memory image erasure list		NO
Others	Other party confirmation function	Other party confirmation display		NO
	CSI function	CSI		YES
	Department management	Department-by-department user restriction		NO
		Number of set departments		NO
		Department-by-department charge management function		NO
	Operation panel display	LCD		20 letters by 2 lines

Large Item	Middle Item	Small Item	Sub Item	Spec.
Others	Auto startup mode			NO
	Distinctive Ring (Only North America and Australia)			YES
	Power consumption	Energy star compatibility		YES
	Automatic Summer Set (Only Europe)			YES
	PBX setting (Only Europe)			YES

[3] CONSUMABLE PARTS

1. Supply system table

A. SEC governments

No.	Name	Content	Life	Product name	Package	Remark
1	Toner CA(Black) with IC	Toner × 10 (Toner :Net Weight 210g) Polyethylene bag × 10	65K	AR-152MT-J	1	∗ Life setup is based on A4 6%. MT=NT∗10

B. SEC/SECL/LAG

No.	Name	Content	Life	Product name	Package	Remark
1	Toner CA(Black) with IC	Toner × 10 (Toner :Net Weight 210g) Polyethylene bag × 10	65K	AR-152MT	1	∗ Life setup is based on A4 6%. MT=NT∗10
2	Developer	Developer × 10 (Developer: Net Weight 170g)	250K	AR-152MD	1	MD=ND∗10
3	Drum kit	Drum × 1 Drum fixing plate × 1	25K	AR-152DR	10	

Note: Printing of the master/individual cartons is made in 2 languages, English/French.
Packed together with the machine: DR 25K/Developer UN/Process UN

C. Europe subsidiaries/East Europe/SCA/SCNZ

No.	Name	Content	Life	Product name	Package	Remark
1	Toner CA(Black) with IC	Toner × 10 (Toner :Net Weight 210g) Polyethylene bag × 10	65K	AR-152LT	1	LT=T∗10
2	Developer	Developer × 10 (Developer :Net Weight 170g)	250K	AR-152LD	1	LD=DV∗10
3	Drum kit	Drum × 1 Drum fixing plate × 1	25K	AR-152DM	10	

Note: Printing of the master/individual cartons is made in 4 languages, English/French/German/Spanish.
Packed together with the machine: DR 25K/Developer UN/Process UN

D. SMEF (Middle East, Africa) Israel/Russia/CIS/Taiwan/Philippines

No.	Name	Content	Life	Product name	Package	Remark
1	Toner CA(Black) with IC	Toner × 10 (Toner :Net Weight 210g) Polyethylene bag × 10	65K	AR-152ET	1	∗ Life setup is based on A4 6%. ET=FT∗10
2	Developer	Developer × 10 (Developer :Net Weight 170g)	250K	AR-152CD	1	CD=SD∗10
3	Drum kit	Drum × 1 Drum fixing plate × 1	25K	AR-152DR	10	

Note: Printing of the master/individual cartons is made in 4 languages, English/French/German/Spanish.
Packed together with the machine: DR 25K/Developer UN/Process UN

E. Asia (Subsidiary)

No.	Name	Content	Life	Product name	Package	Remark
1	Toner CA(Black) with IC	Toner × 10 (Toner :Net Weight 210g) Polyethylene bag × 10	65K	AR-152CT	1	∗ Life setup is based on A4 6%. CT=ST∗10
2	Developer	Developer × 10 (Developer :Net Weight 170g)	250K	AR-152CD	1	CD=SD∗10
3	Drum kit	Drum × 1 Drum fixing plate × 1	25K	AR-152DR	10	

Note: Printing of the master/individual cartons is made in 4 languages, English/French/German/Spanish.
Packed together with the machine: DR 25K/Developer UN/Process UN

F. SRH/SOCC Chinese language version

No.	Name	Content	Life	Product name	Package	Remark
1	Toner CA(Black) with IC	Toner × 10 (Toner :Net Weight 210g) Polyethylene bag × 10	65K	AR-152CT-C	1	∗ Life setup is based on A4 6%. CTC=STC∗10
2	Developer	Developer × 10 (Developer :Net Weight 170g)	250K	AR-152CD-C	1	CDC=SDC∗10
3	Drum kit	Drum × 1 Drum fixing plate × 1	25K	AR-152DR-C	10	

Note: Printing of the master/individual cartons is made in 2 languages, English/Chinese.
Packed together with the machine: DR 25K/Developer UN/Process UN

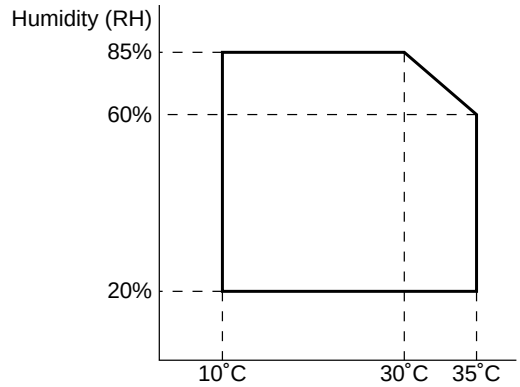
2. Environmental

The environmental conditions for assuring the copy quality and the machine operations are as follows:

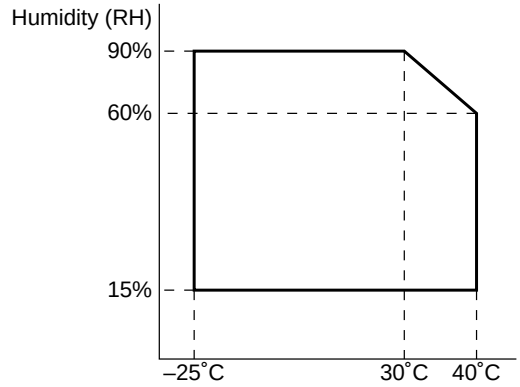
(1) Normal operating condition

Temperature:20˚C~25
Humidity:65 ± 5%RH

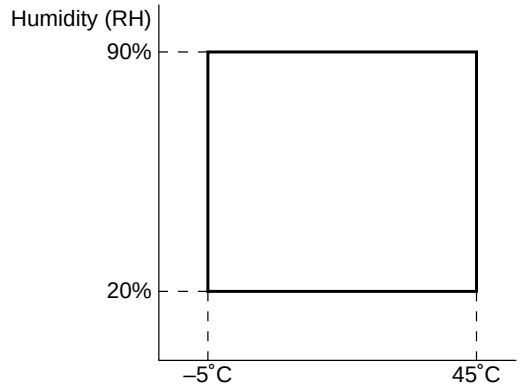
(2) Acceptable operating condition



(3) Optical condition

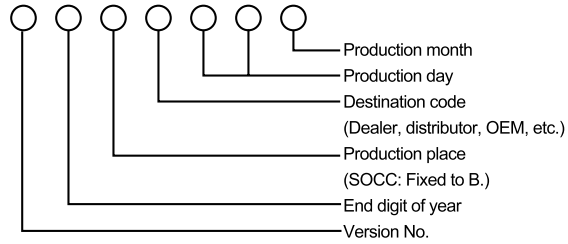


(4) Supply storage condition



3. Production control number(lot No.) identification

〈Developing cartridge〉

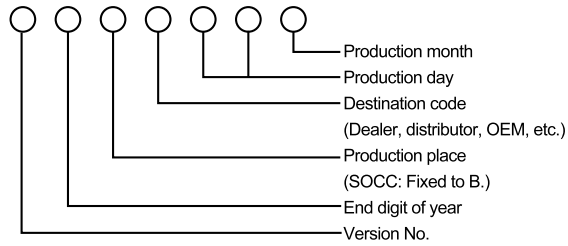


∗:Destination

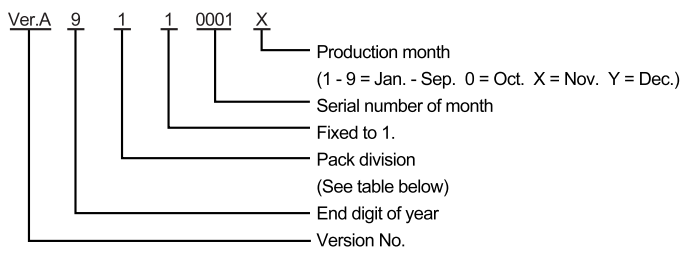
Division		No.
EX Destination	A same pack	G
	B same pack	H
Option Destination	A	P
	B	Q

〈Drum cartridge〉

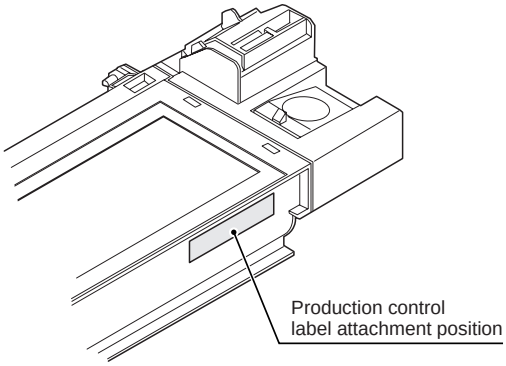
The label on the drum cartridge shows the date of production. (SOCC production)

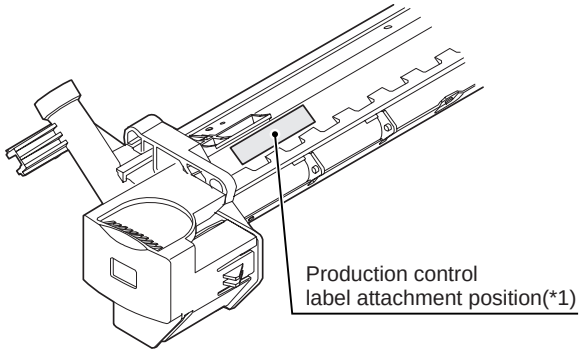


〈JAPAN production〉


Ver.A 9 1 1 0001 X
Production month
(1 - 9 = Jan. - Sep. 0 = Oct. X = Nov. Y = Dec.)
Serial number of month
Fixed to 1.
Pack division
(See table below)
End digit of year
Version No.

Division	No.
Ex production	1
Option	2
Same pack	3

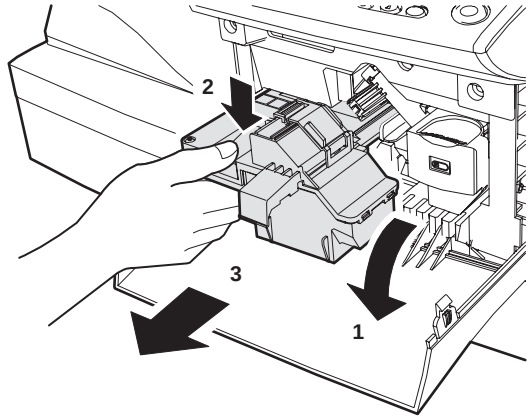




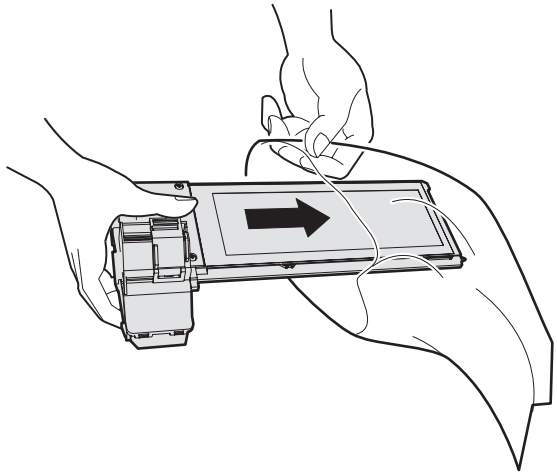
∗1 The production control label is not attached to the cartridge of a China product.

4. TD cartridge replacement

1) Open the front and side cabinets of the copier.
2) Keep holding Toner lover, and
3) Carefully pull out Toner unit from the copier.



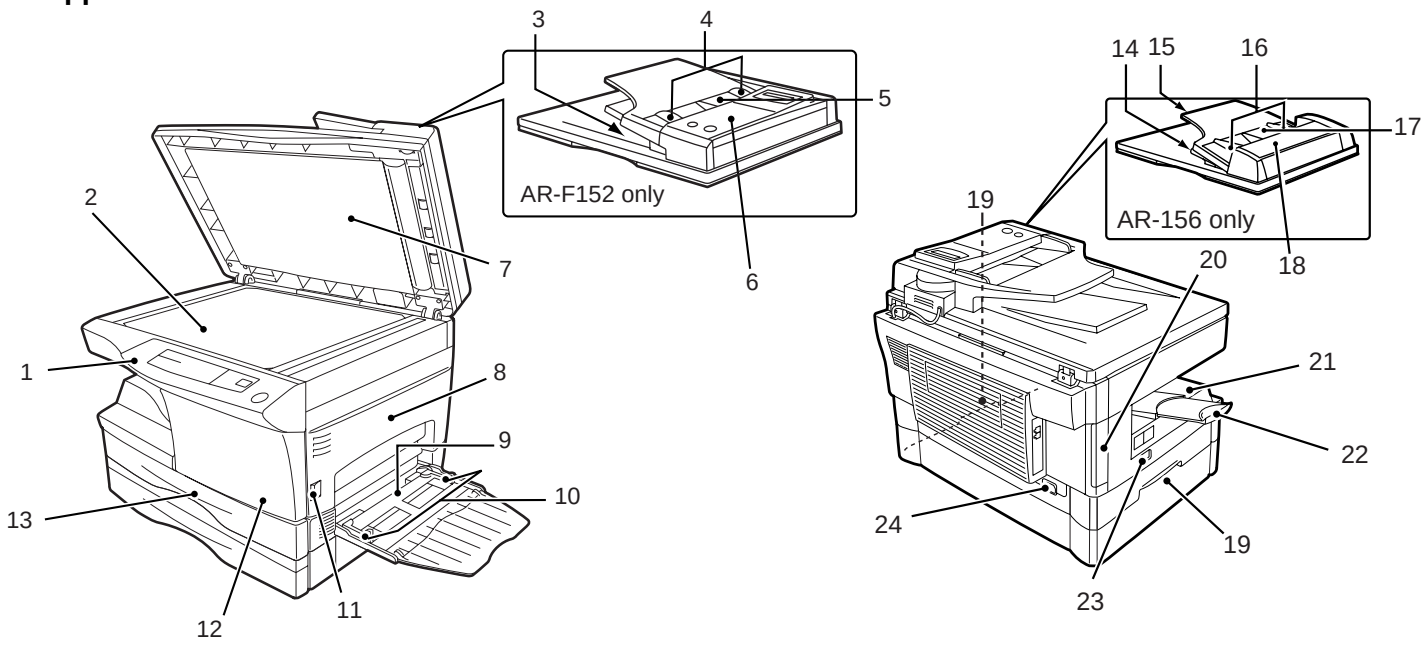
4) Put Toner unit in a collection bag immediately after removing it from the copier



Note: Never carry exposed Toner unit. Be sure to put it in the collection bag.

[4] EXTERNAL VIEWS AND INTERNAL STRUCTURES

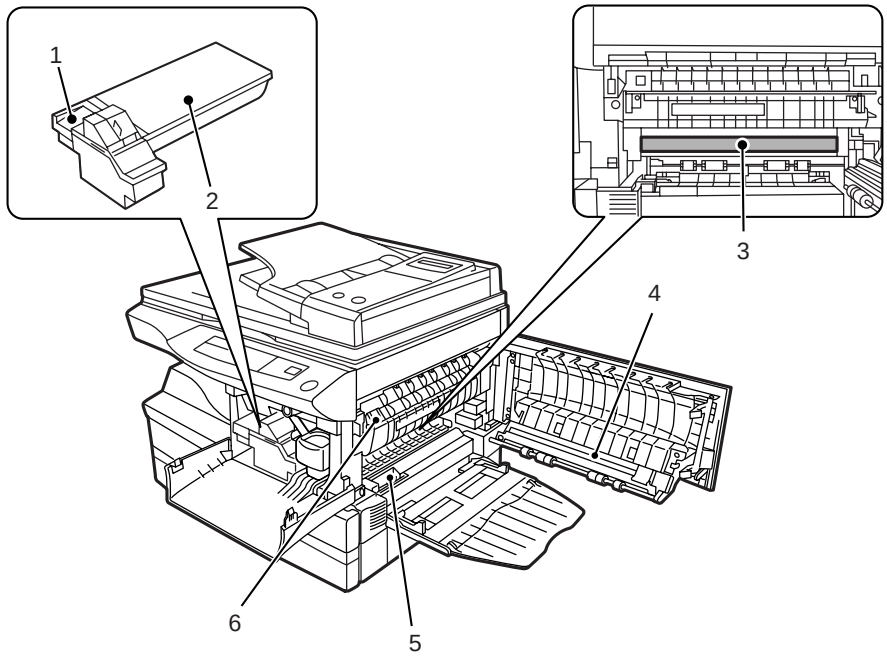
1. Appearance



1	Operation panel	2	Original table	3	SPF exit area ∗1
4	Original guides ∗1	5	Document feeder tray ∗1	6	FAX operation panel ∗1
7	Original cover	8	Side cover	9	Bypass tray
10	Bypass tray guides	11	Side cover open button	12	Front cover
13	Paper tray	14	R-SPF exit area ∗2	15	Middle tray ∗2
16	Original guides ∗2	17	Document feeder tray ∗2	18	Feeding roller cover ∗2
19	Handle	20	Cover for optional printer interface ∗	21	Paper output tray
22	Paper output tray extension	23	Power switch	24	Power cord socket

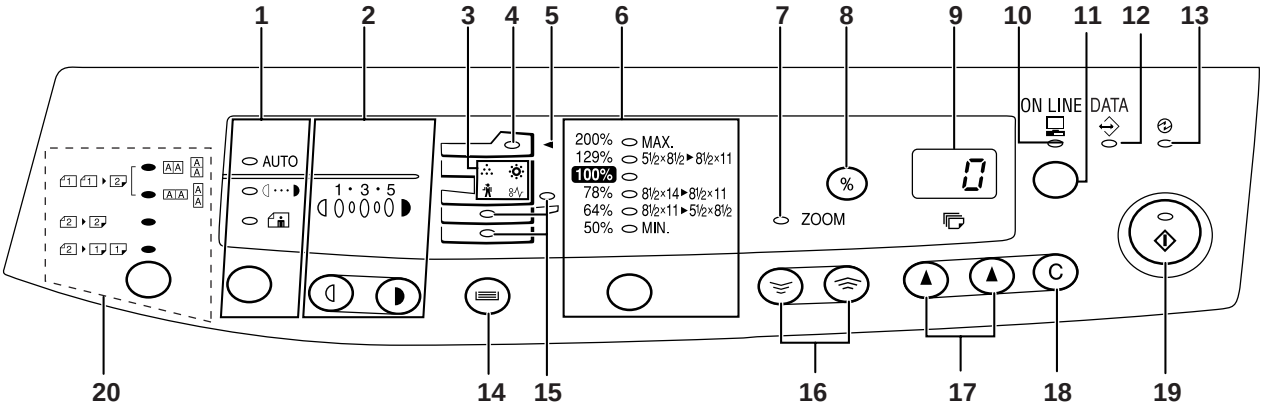
∗ A GDI expansion kit is optional. ∗1 AR-F152 only ∗2 AR-156 only

2. Internal



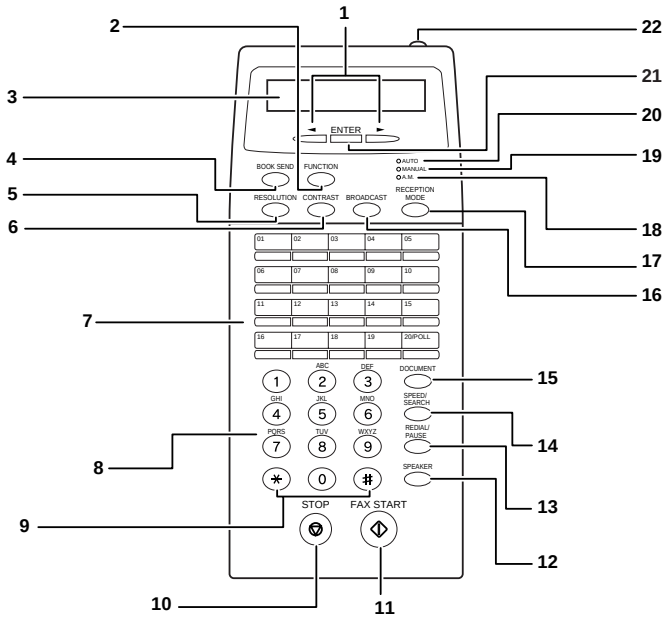
1	Toner cartridge lock release lever	2	Toner cartridge	3	Photoconductive drum
4	Transfer charger	5	Charger cleaner	6	Fusing unit release lever

3. Operation panel



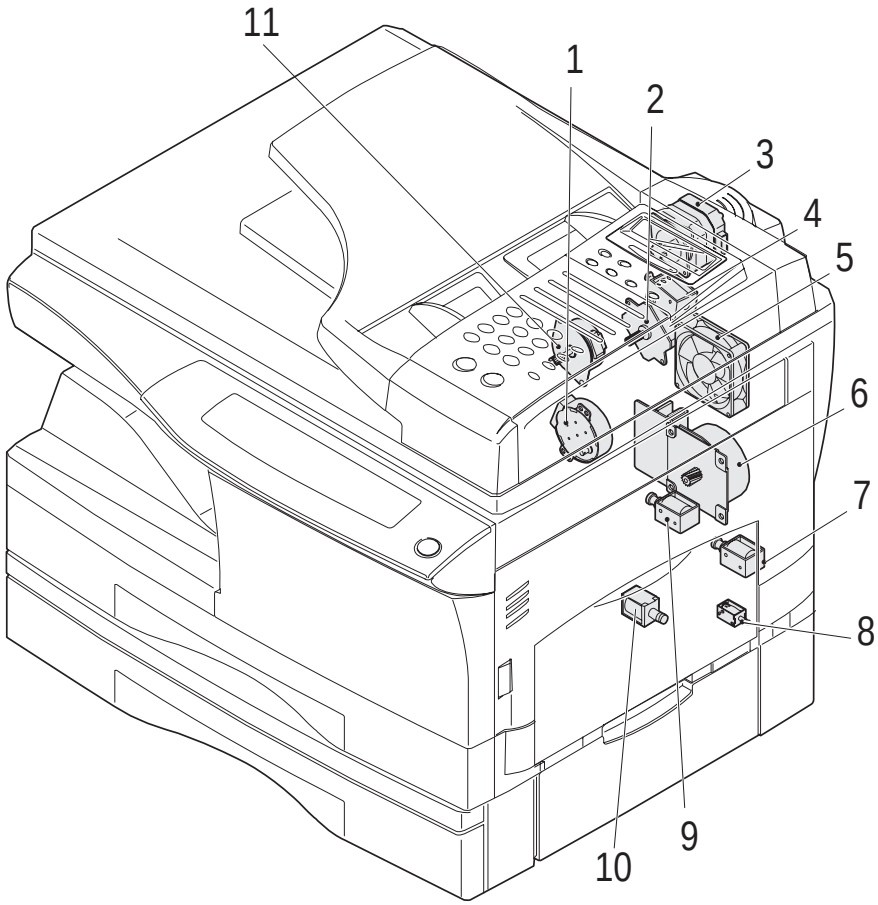
1	**Exposure mode selector key and indicators** Use to sequentially select the exposure modes: AUTO, MANUAL or PHOTO. Selected mode is shown by a lit indicator.	2	**Light and dark keys and exposure indicators** Use to adjust the MANUAL or PHOTO exposure level. Selected exposure level is shown by a lit indicator. Use to start and terminate user program setting.
3	**Alarm indicators** :Developer replacement required indicator :Misfeed indicator :TD cartridge replacement required indicator :Maintenance indicator	4	**SPF indicator** (AR-156, AR-F152 only)
5	**SPF misfeed indicator** (AR-156, AR-F152 only)	6	**Copy ratio selector key and copy ratio indicators** Use to sequentially select preset reduction/enlargement copy ratios. Selected copy ratio is shown by a lit indicator.
7	**Zoom indicator**	8	**Copy ratio display (%) key**
9	**Display** Displays the specified copy quantity, zoom copy ratio, user program code, and error code.	10	**ON LINE indicator / ON LINE KEY** Lights up when the machine is used as a printer. To use as a printer, an optional printer expansion kit is needed. (AR-151, AR-156 only)
11	**ON LINE KEY** Changes between the on-line and off-line modes when the PCL expansion kit has been installed and a PCL printer is used. Changes modes from the off-line to on-line when the GDI expansion kit has been installed and a GDI printer is used. (AR-151, AR-156 only)	12	**DATA indicator** Indicates that the printer is receiving or processing print data. To use the copier as a printer, an optional PCL expansion kit is needed. (AR-151, AR-156 only)
13	**Power save indicator** Lights up when the copier is in a power save mode.	14	**Tray select key** Use to select a paper feed station (paper tray or bypass tray).
15	**Paper feed location indicators** Light up to show the selected paper feed station.	16	**Zoom keys** Use to select any reduction or enlargement copy ratio from 50% to 200% in 1% increments.
17	**Copy quantity keys** • Use to select the desired copy quantity (1 to 99). • Use to make user program entries.	18	**Clear key** • Press to clear the display, or press during a copy run to terminate copying. • Press and hold down during standby to display the total number of copies made to date.
19	**Print key and ready indicator** • Copying is possible when the indicator is on. • Use to set a user program.	20	**Duplex Mode select key and indicator** (AR-156 only)

4. Operation Panel (AR-F152 only)



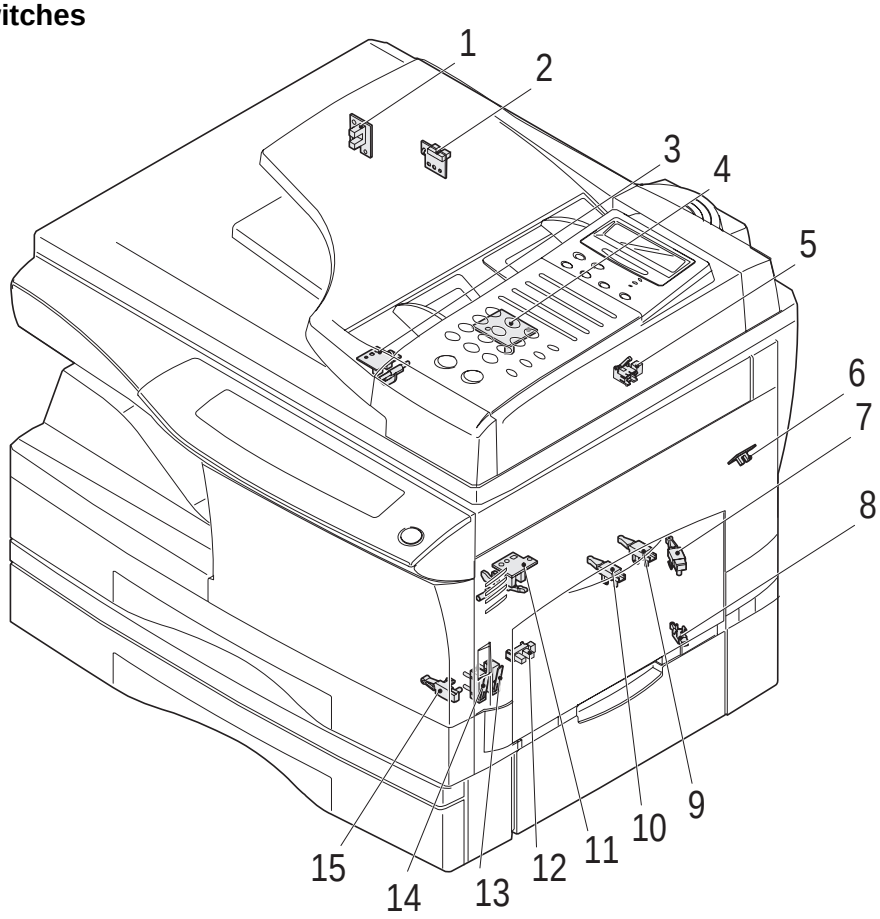
1	**Left arrow key (◄) and right arrow key (►)** Press these keys to scroll through a menu. During input mode, these keys are also sometimes used to move the cursor.	2	**FUNCTION key** Press this key to enter function mode.
3	**Liquid crystal display** Shows various messages during fax operation and programming.	4	**BOOK SEND key** Press this key to fax a document from the original table.
5	**RESOLUTION key** Press this key to adjust the resolution before sending faxes.	6	**CONTRAST key** Press this key to adjust the contrast before sending faxes.
7	**Rapid keys** Press one of these keys to dial a fax or telephone number automatically. Press Rapid key 20 to start polling. (Note that you must attach the Rapid key labels.)	8	**Number keys** Press these keys to dial numbers, and enter numbers and letters during number/name storing procedures.
9	∗ **/ #** **Press these keys to enter symbols during the name storing procedure.** **Press the "∗" key to change from pulse dialing to tone dialing mode.**	10	STOP key Press this key to stop an operation before it is completed, or to delete the number that was last input. This key is also used to close the line when manually dialing.
11	**FAX START key** Press this key to begin sending a fax or manually receiving a fax.	12	**SPEAKER key** Press this key to begin manual dialing. (To close the line, press the SPEAKER key again.)
13	**REDIAL/PAUSE key** Press this key to automatically redial the last number you dialed. Also, press this key to insert a pause when entering numbers.	14	**SPEED/SEARCH key** Press this key to dial a two digit Speed Dial number. During character inputting, use this key to delete an incorrect entry. Also, press this key twice to search for an automatic dialing number.
15	**DOCUMENT key** Press this key to perform a direct send fax transmission.	16	**BROADCAST key** Press this key to send documents to a group of receiving fax machines.
17	**RECEPTION MODE key** Press this key to select the mode of reception.	18	**A.M. light** This light indicates the answering machine will answer the line if properly connected.
19	**MANUAL light** This light indicates that the machine must be answered manually.	20	**AUTO light** This light indicates that the machine will answer the machine automatically.
21	**ENTER key** Press this key to decide an item in a menu, or to enter numbers and letters you have typed in.	22	**LCD contrast dial** Turn this dial to adjust the contrast level of the LCD.

5. Motors and solenoids



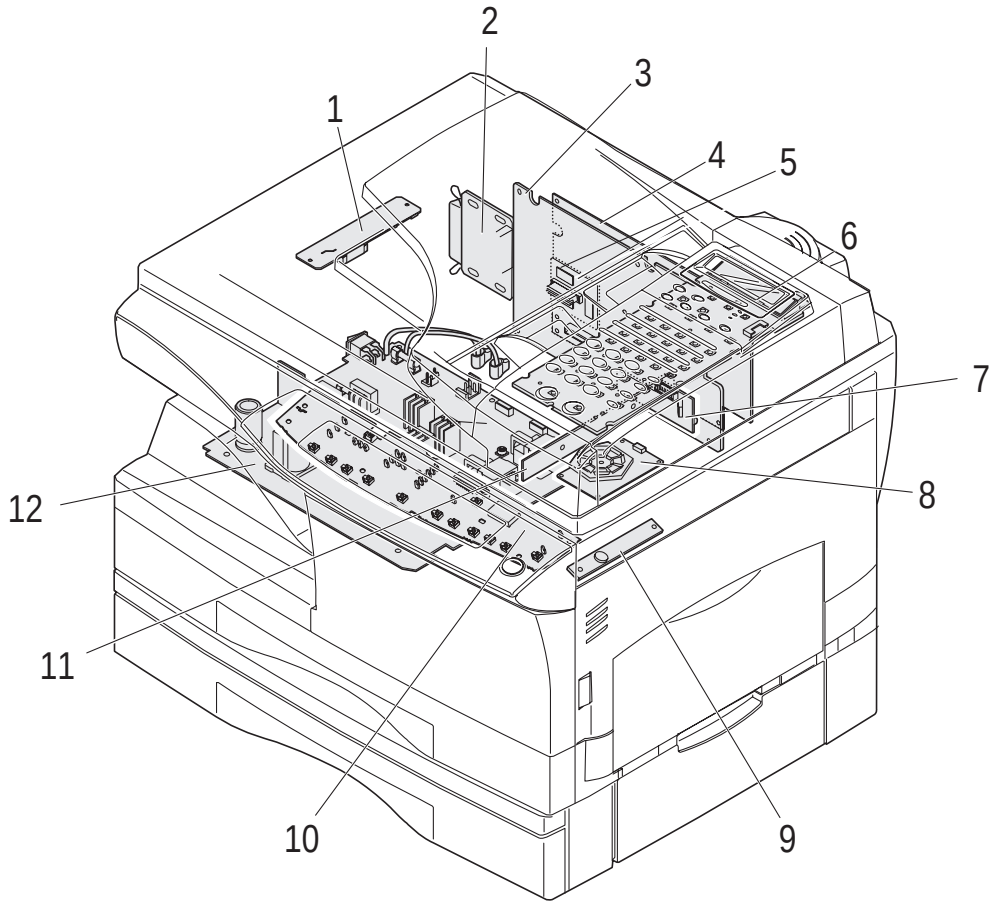
No.	Part name	Control signal	Function operation
1	Toner motor	TM	Supplies toner.
2	Mirror motor	MRMT	Drives the optical mirror base (scanner unit).
3	SPF motor	SPMT	Drives the single pass feeder
4	Original feed solenoid	SPUS	Original feed solenoid
5	Cooling fan motor	VFM	Cools the optical section.
6	Main motor	MM	Drives the copier.
7	Resist roller solenoid	RRS	Resist roller rotation control solenoid
8	Multi paper feed solenoid	MPFS	Multi manual pages feed solenoid
9	Paper feed solenoid	CPFS1	Cassette paper feed solenoid 1
10	Paper feed solenoid	CPFS2	Cassette paper feed solenoid 2
11	Duplex Motor	DMT	Drivers the duplex paper transport section

6. Sensors and switches



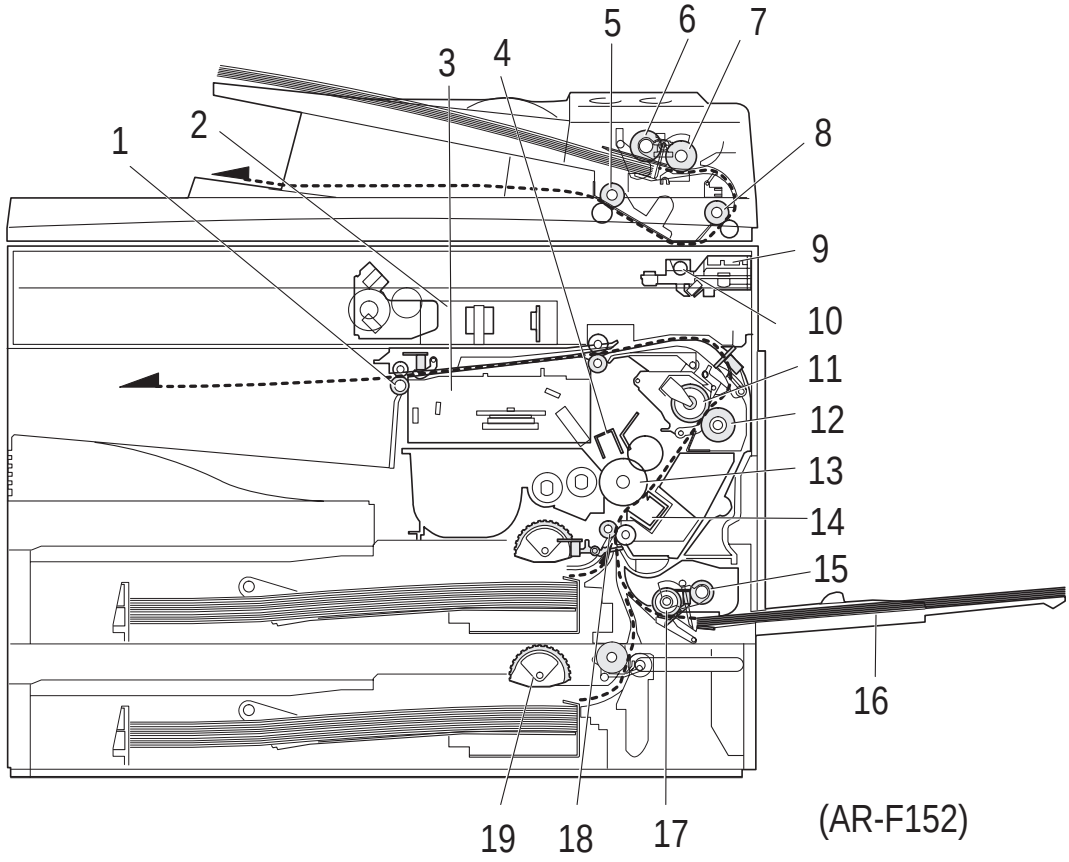
No.	Name	Signal	Type	Function	Output
1	Mirror home position sensor	MHPS	Transmission sensor	Mirror (scanner unit) home position detection	“H” at home position
2	SDOD sensor	SDOD	Transmission sensor	SPF open/close detection Book sensor	“L” at paper pass
3	POD sensor	POD	Transmission sensor	Paper exit detection	“H” at paper pass
4	SPF sensor	SPID/ SDSW	Transmission sensor	Paper entry detection Cover open/close detection	“L” at paper pass
5	SPPD sensor	SPPD	Transmission sensor	Paper transport detection	“L” at paper pass
6	PPD2 sensor	PPD2	Transmission sensor	Paper transport detection 2	“L” at paper pass
7	Cassette detection switch	CED1	Microswitch	Cassette installation detection	“H” at cassette insertion
8	Cassette detection switch	CED2	Microswitch	Cassette installation detection	
9	Paper size detection switch	PSW1	Microswitch	Detects A4/Letter or smaller sizes	1 or 0V of 5V at door open
10	Paper size detection swtich 2	PSW2	Microswitch	Detects A4/Letter or smaller sizes	
11	PPD1 sensor	PPD1	Transmission sensor	Paper transport detection 1	“L” at paper pass
12	PPD3 sensor	PPD3	Transmission sensor	Paper transport detection 3	“L” at paper pass
13	Door switch	DSW	Micro switch	Door open/close detection (safety switch for 5V)	1 or 0V of 5V at door open
14	Door switch	DSW	Micro switch	Door open/close detection (safety switch for 24V)	1 or 0V of 24V at door open
15	Drum reset switch	DRST	Micro switch	New drum detection switch	Instantaneously “H” at insertion of new drum

7. PWB unit



No.	Name	Function
1	Exposure lamp invertor PWB	Exposure lamp (Xenon lamp) control
2	GDI/USB PWB	For GDI/USB interface
3	Main PWB (MCU)	Copier control
4	FAX control PWB	For FAX control
5	Memory PWB 6MB	For memorizing data
6	FAX operation PWB	Operation input/LCD display
7	LSU PWB	For laser control
8	LSU motor PWB	For polygon motor drive
9	TCS PWB	For toner sensor control
10	Operation PWB	Operation input/display
11	CCD sensor PWB	For image scanning
12	Power PWB	AC power input, DC voltage control, High voltage control

8. Cross sectional view



No.	Part name	Function and operation
1	Paper exit roller	Roller for paper exit
2	Lens unit	Scans the original image with the lens and the CCD.
3	LSU (Laser unit)	Converts the original image signal into laser beams and writes onto the drum.
4	Main charger	Provides negative charges evenly to the drum surface.
5	Paper exit roller	Discharges documents.
6	Pickup roller	Picks up documents.
7	Separation roller	Separates documents to feed properly.
8	PS roller	Feeds documents to the scanning section.
9	Scanner unit	Illuminates the original with the copy lamp and passes the reflected light to the lens unit (CCD).
10	Exposure lamp	Exposure lamp (Xenon lamp) Illuminates original
11	Heat roller	Fuses toner on the paper. (Teflon roller)
12	Pressure roller	Fuses toner on the paper. (Silicon rubber roller)
13	Drum	Forms images.
14	Transfer unit	Transfers images onto the drum.
15	Pickup roller	Picks up the manual feed paper. (In multi feed only)
16	Manual paper feed tray	Tray for manual feed paper
17	Manual paper feed roller	Transport the paper from the manual paper feed port.
18	PS roller unit	Takes synchronization between the lead edge and the rear edge of the paper.
19	Paper feed roller	Picks up a sheet of paper from the cassette.

[5] UNPACKING AND INSTALLATION

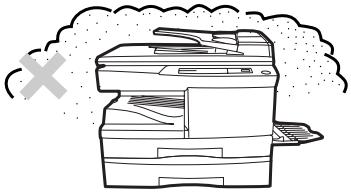
1. COPIER INSTALLATION

Improper installation may damage the copier. Please note the following during initial installation and whenever the copier is moved.

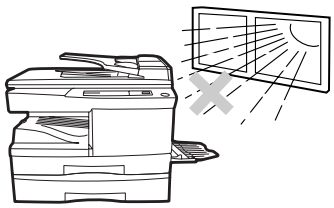
Caution: If the copier is moved from a cool place to a warm place, condensation may form inside the copier. Operation in this condition will cause poor copy quality and malfunctions. Leave the copier at room temperature for at least 2 hours before use.

Do not install your copier in areas that are:

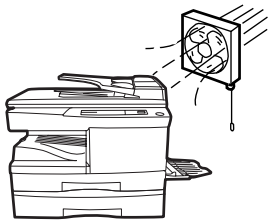
- damp, humid, or very dusty



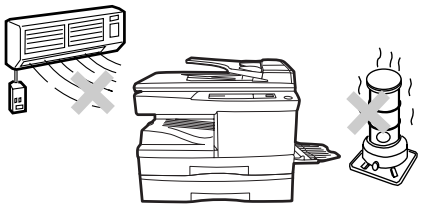
- exposed to direct sunlight



- poorly ventilated



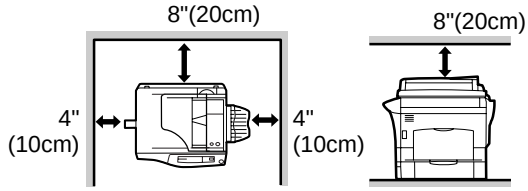
- subject to extreme temperature or humidity changes, e.g., near an air conditioner or heater.



The copier should be installed near an accessible power outlet for easy connection.

Be sure to connect the power cord only to a power outlet that meets the specified voltage and current requirements.
Also make certain the outlet is properly grounded.

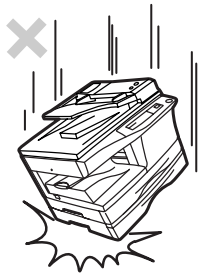
Be sure to allow the required space around the machine for servicing and proper ventilation.



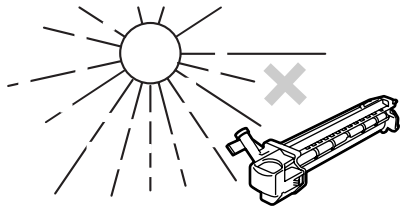
2. CAUTIONS ON HANDLING

Be careful in handling the copier as follows to maintain the performance of this copier.

Do not drop the copier, subject it to shock or strike it against any object.



Do not expose the drum cartridge to direct sunlight.
Doing so will damage the surface (green portion) of the drum cartridge, causing poor print quality.



Store spare supplies such as drum cartridges and TD cartridges in a dark place without removing from the package before use.

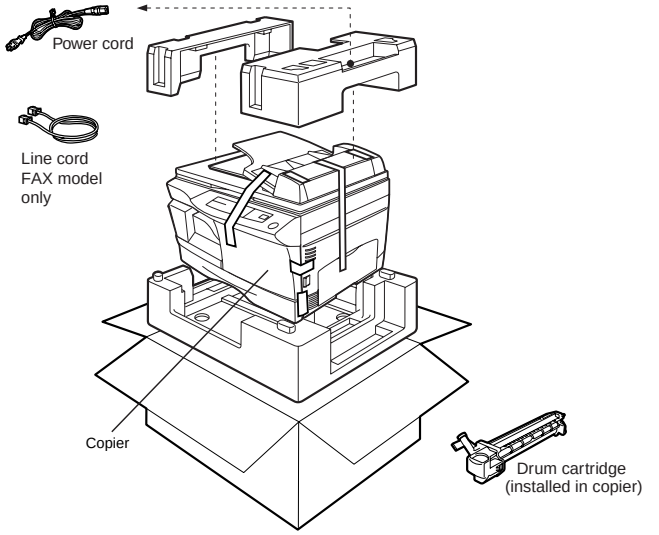
If they are exposed to direct sunlight, poor print quality may result.

Do not touch the surface (green portion) of the drum cartridge.

Doing so will damage the surface of the cartridge, causing poor print quality.

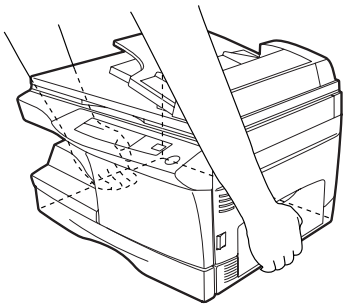
3. CHECKING PACKED COMPONENTS AND ACCESSORIES

Open the carton and check if the following components and accessories are included.



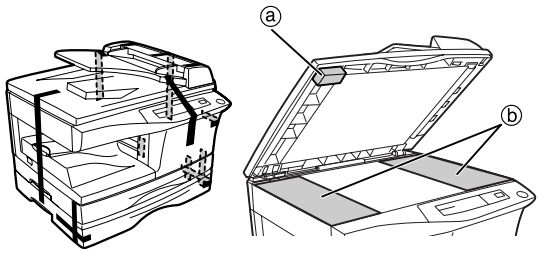
4. UNPACKING

Be sure to hold the handles on both sides of the copier to unpack the copier and carry it to the installation location.

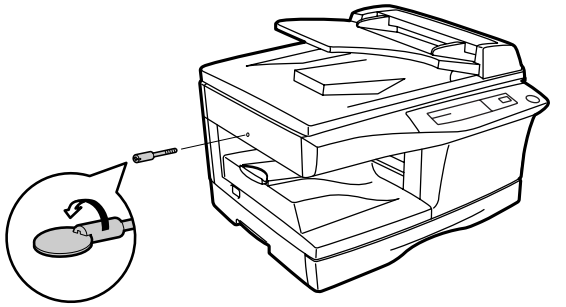


5. REMOVING PROTECTIVE PACKING MATERIALS

1) Remove pieces of tape and protective cover. Then open the original cover and remove protective materials (a) and (b).

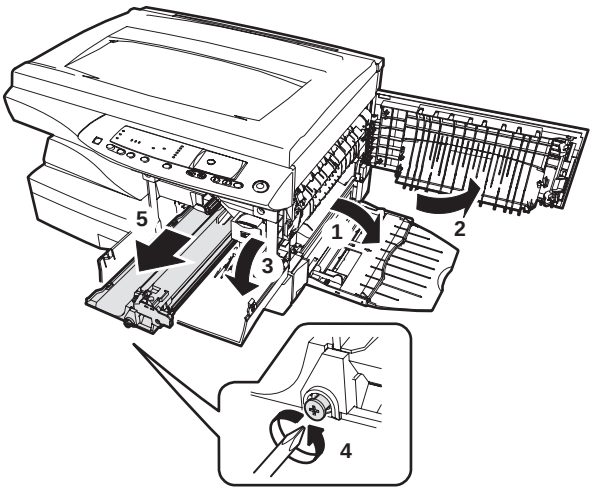


2) Use a coin (or suitable object) to remove the screw. Store the screw in the paper tray because it will be used if the copier has to be moved.

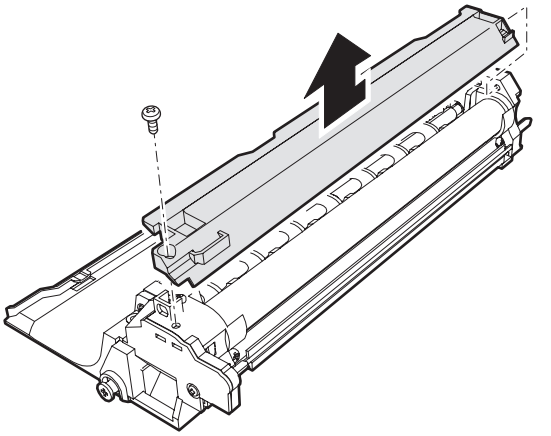


6. Developer unit INSTALLATION

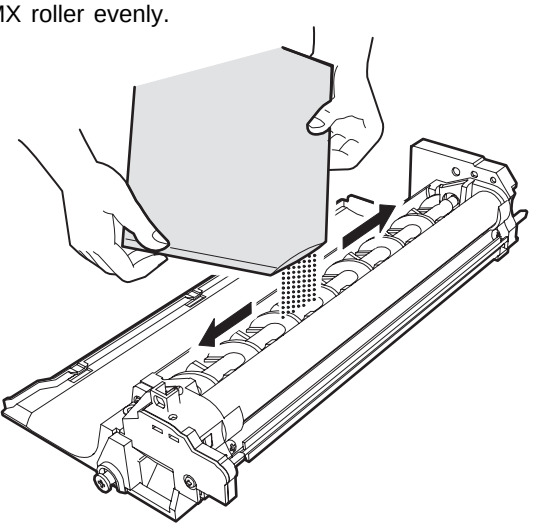
1) 2) 3) Open the side and front cabinets of the copier.
4) Remove the locking tape of the developer unit.
5) Remove the screw which is fixing the copier and Developer unit.
6) Remove Developer unit slowly from the copier.



7) Remove the screw (1 pc).
8) Remove Upper developer unit.



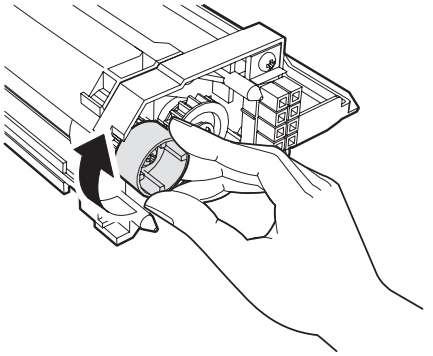
9) Shake the aluminum bag to stir developer
10) Supply developer from the aluminum bag to the top of the MX roller evenly.



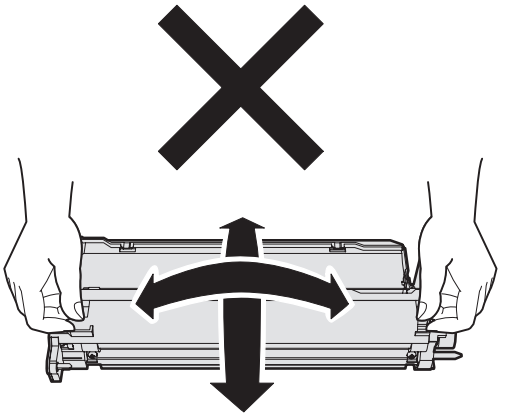
Note: Be careful not to splash developer outside Developer unit.

11) Attach Upper developer unit and fix it with a screw.

12) Rotate the MG roller gear to distribute developer evenly.



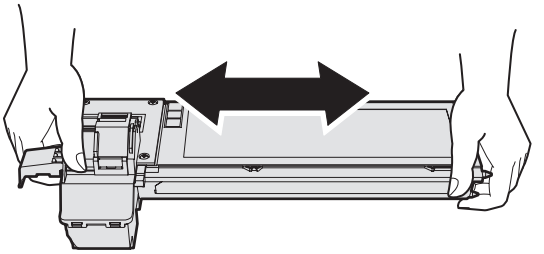
Note: Never rotate the gear in the reverse direction.
Note: When carrying Developer unit, do not tilt it extremely as shown with the arrow in the figure below. (Prevention of splash of developer)



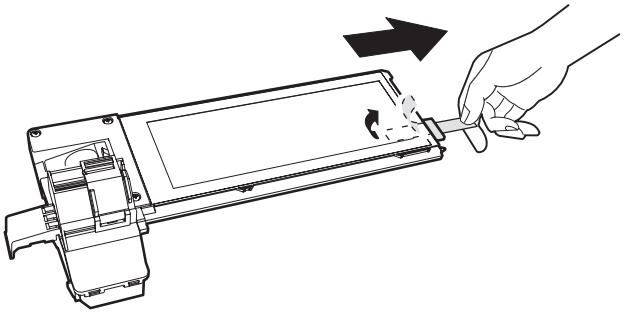
13) Insert Developer unit carefully into the copier.
Note: Quick insertion may result in splash of developer. Be sure to insert carefully.
14) Confirm that Developer unit is completely inserted to the bottom of the machine, fix Developer unit and the machine with a screw.
15) Completion of Developer unit installation

7. TONER CARTRIDGE INSTALLATION

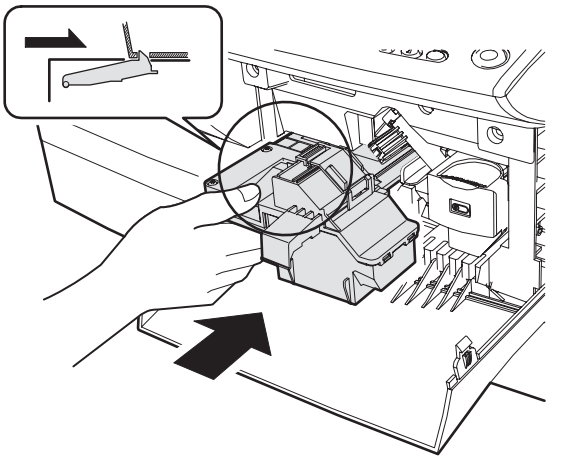
1) To prevent against uneven distribution of toner, hold Toner unit with both hands and shake it several times horizontally.



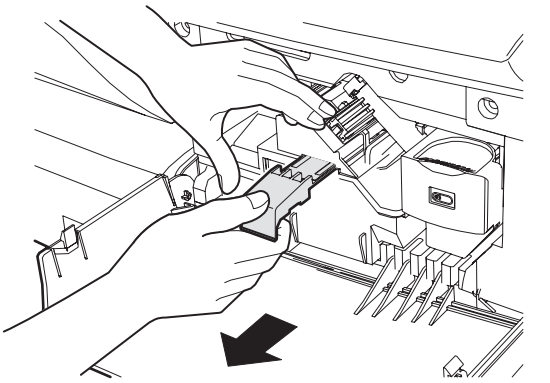
2) Hold the section of Toner unit shown in the figure below, remove the packing tape, and remove the cushion.
3) Pull out the cushion in the arrow direction.



4) Insert Toner unit carefully into the copier.
5) Insert until the hook is engaged with the copier as shown in the figure below.



6) Pull out the shutter in the arrow direction.

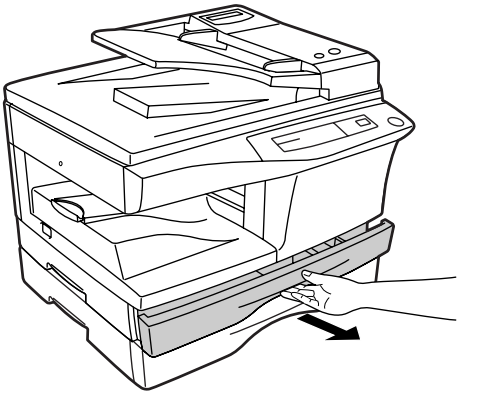


Note: Do not hold and carry the shutter. Otherwise the shutter may drop and Toner unit may drop.
7) Completion of Toner unit installation
Close the front and side cabinets.

8. LOADING COPY PAPER

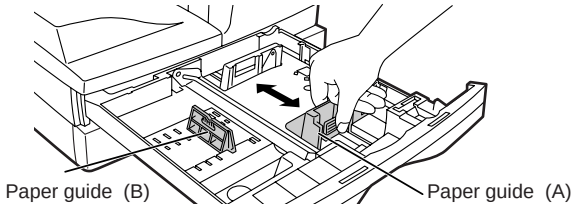
Note: This copier is equipped with two paper trays. Load copy paper into the two paper trays.

1) Raise the handle of the paper tray and pull the paper tray out until it stops.



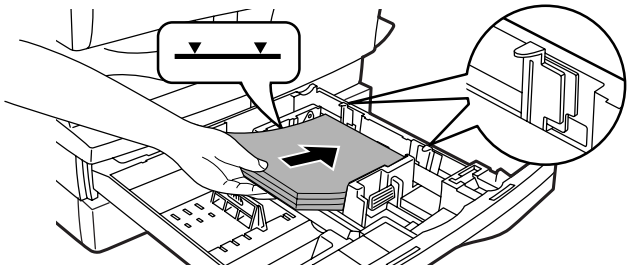
2) Remove the pressure plate lock. Rotate the pressure plate lock in the direction of the arrow to remove it while pressing down the pressure plate of the paper tray.

3) Store the pressure plate lock which has been removed in step 2 and the screw which has been removed when unpacking (see page 4-2, step 2 of REMOVING PROTECTIVE PACKING MATERIALS) in the front of the paper tray. To store the pressure plate lock, rotate the lock to fix it on the relevant location.
4) Adjust the paper guides on the paper tray to the copy paper width and length.
   Squeeze the lever of paper guide (A) and slide the guide to match with the width of the paper.
   Move paper guide (B) to the appropriate slot as marked on the tray.



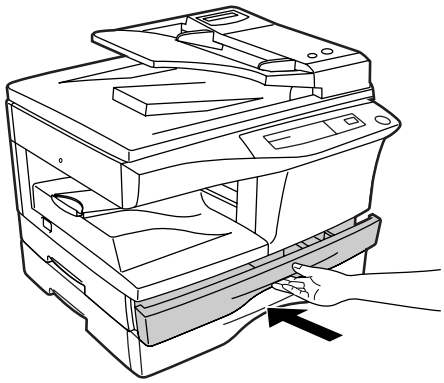
5) Fan the copy paper and insert it into the tray. Make sure the edges go under the corner hooks.

Note: Do not load paper above the maximum height line (▼▼). Exceeding the line will cause a paper misfeed.



6) Gently push the paper tray back into the copier.

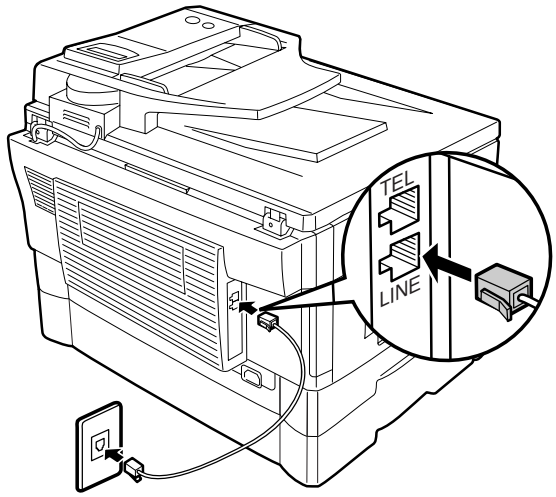
Note: After loading copy paper, to cancel the blinking "P" without restarting copying, press the clear (C) key. The "P" in the display will go out and the ready (◈) indicator will light up.



9. Connecting the Telephone Line Cord

Plug one end of the telephone line cord into the jack on the unit marked "LINE" .Plug the other side into a standard (RJ11C) single-line telephone wall jack. Be sure not to plug this line cord into the "TEL" jack. The "TEL" jack is used to attach an extension telephone or answering machine to the unit. (See "Connecting Other Devices" in this chapter for details.)

Note: If your area experiences a high incidence of lightning or power surges, we recommend that you install surge protectors for the power and telephone lines. Surge protectors can be purchased from your dealer or at most telephone specialty stores.



10. Connecting Other Devices

If desired, an answering machine or external telephone can be connected to the unit through the telephone jack, labeled "TEL", on the rear of the unit.

- Connecting an answering machine to the unit allows you to receive both voice and fax messages when you are out. To use this feature, first change the outgoing message of your answering machine, and then set the reception mode of the unit to "A.M". (Answering Machine mode) when you go out.

Note: If you are using distinctive ringing with an answering machine, you do not need to follow the procedure described below. (Please note that when distinctive ringing is used, the answering machine must be connected to a separate wall jack, not to your fax.)

The outgoing message of your answering machine should be changed to inform callers who want to send a fax to press their FAX START key.

Comments:

1) It is advisable to keep the length of the message under 10 seconds. If it is too long, you may have difficulty receiving faxes sent by automatic dialing.
2) Your callers can even leave a voice message and send a fax message on the same call. Modify your outgoing message to explain that this can be done by pressing their FAX START key after leaving their voice message.

- You can connect an extension phone to the unit to make and receive calls like any other extension phone on your line. Even if you pick up the extension phone and hear a fax tone, the unit will automatically cut in and take over the line. Note, however, that if you also have a PC modem on the same line, you must turn on the Remote Reception function, and deactivate the Fax Signal Receive function. See "Setting Up the Unit for Use with a PC Modem" and "Using the Remote Reception Function" in Chapter 2).

Note: The Remote Reception function is initially set to "ON".

11. POWER TO COPIER

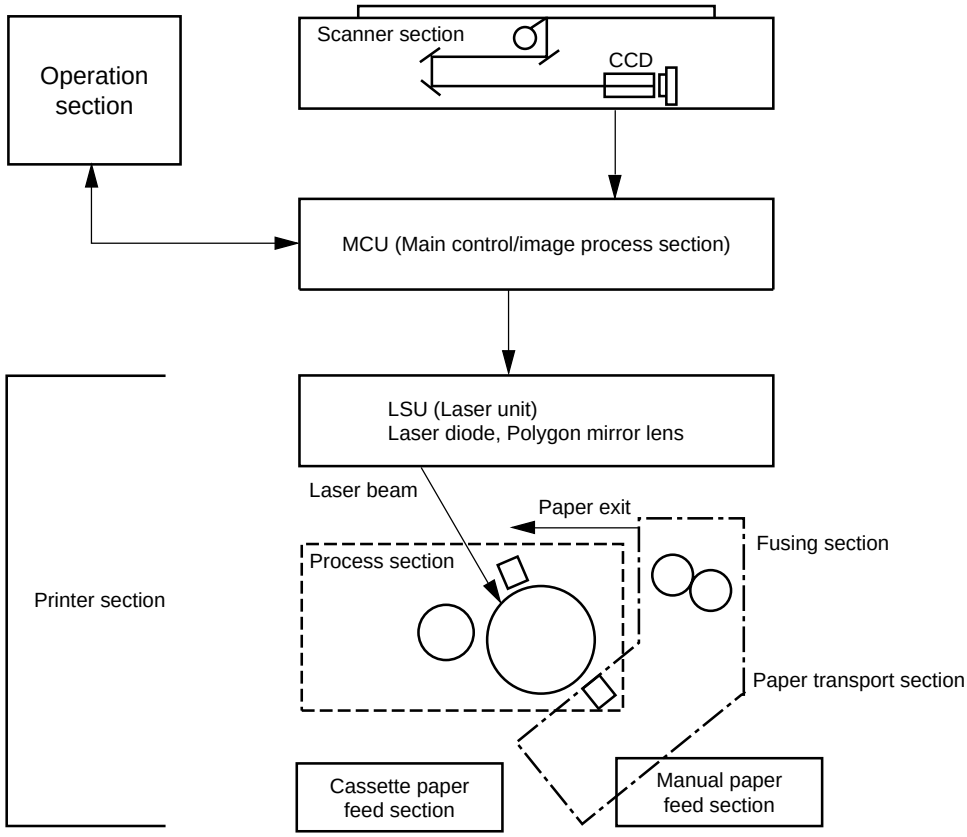
1) Ensure that the power switch of the copier is in the OFF position. Insert the attached power cord into the power cord socket at the rear of the copier.
2) Plug the other end of the power cord into the nearest outlet.

[6] OPERATIONAL DESCRIPTIONS

1. Outline of operation

The outline of operation is described referring to the basic configuration.

(Basic configuration)



(Outline of copy operation)

Setting conditions

1) Set copy conditions such as the copy quantity and the copy density with the operation section, and press the COPY button. The information on copy conditions is sent to the MCU.

Image scanning

2) When the COPY button is pressed, the scanner section starts scanning of images.
   The light from the copy lamp is reflected by the document and passed through the lens to the CCD.

Photo signal/Electric signal conversion

3) The image is converted into electrical signals by the CCD circuit and passed to the MCU.

Image process

4) The document image signal sent from the CCD circuit is processed under the revised conditions and sent to the LSU (laser unit) as print data.

Electric signal/Photo signal (laser beam) conversion

5) The LSU emits laser beams according to the print data.
   (Electrical signals are converted into photo signals.)
6) The laser beams are radiated through the polygon mirror and various lenses to the OPC drum.

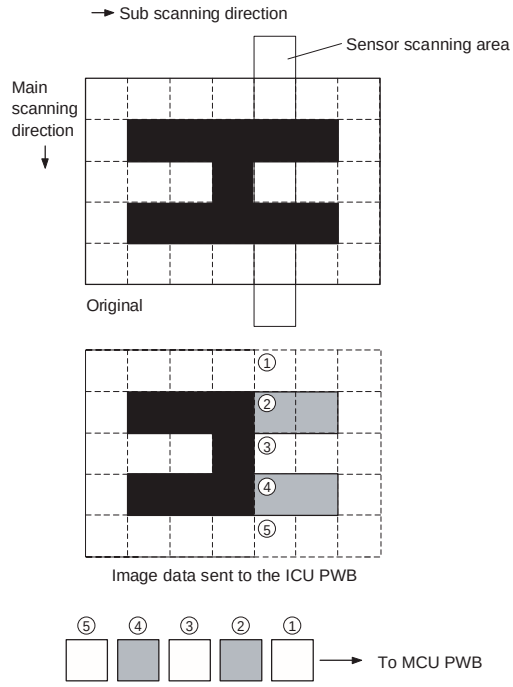
Printing

7) Electrostatic latent images are formed on the OPC drum according to the laser beams, and the latent images are developed to be visible images (toner images).
8) Meanwhile the paper is fed to the image transfer section in synchronization with the image lead edge.
9) After the transfer of toner images onto the paper, the toner images are fused to the paper by the fusing section. The copied paper is discharged onto the exit tray.

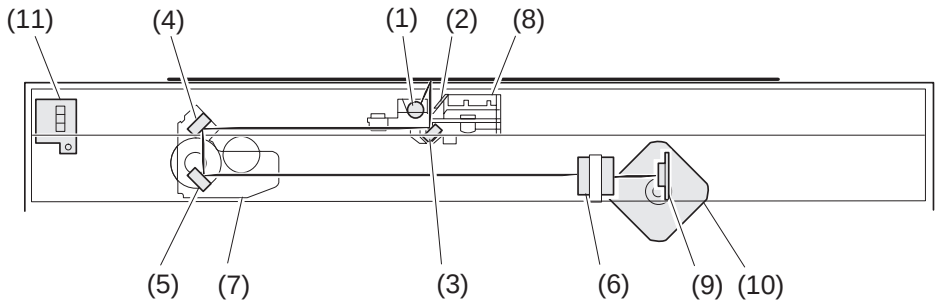
2. Scanner section

A. How to scan documents

The scanner has sensors that are arranged in a line. These sensors scan a certain area of a document at a time and deliver outputs sequentially. When the line is finished, the next line is scanned, and this procedure is repeated. The figure below shows the case where the latter two sections of an image which are scanned are shown with solid lines and the former two sections which are being transmitted are shown with dotted lines.
The direction of this line is called “main scanning direction,” and the scanning direction “sub scanning direction.”
In the figure above, one line is divided into 4 sections. Actually, however, one line is divided into thousands of sections. For scanning, the light receiving element called CCD is used.
The basic resolution indicates the scanner capacity. The basic resolution is expressed in dpi (dot/inch) which shows the number of light emitting elements per inch on the document.
The basic resolution of this machine is 400dpi.
In the sub scanning direction, at the same time, the motor that drives the optical system is controlled to scan the image at the basic resolution.



B. Basic structure of scanner section



1	Copy lamp (Xenon lamp)	2	Reflector (light conversion plate)	3	No. 1 mirror
4	No. 2 mirror	5	No. 3 mirror	6	Lens
7	No. 2/3 mirror unit	8	Copy lamp unit	9	CCD
10	Mirror motor	11	MHPS (Mirror home position sensor)		

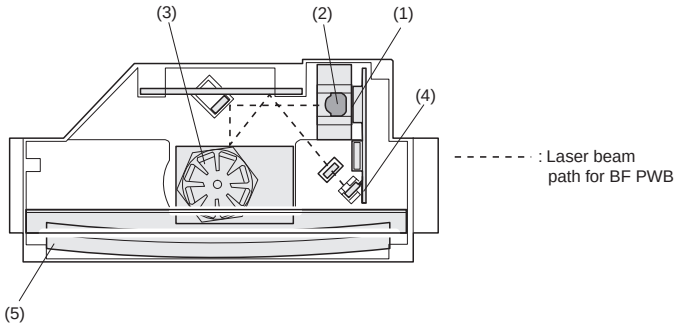
The scanner unit performs scanning in the digital optical system.
The light from the light source (Xenon lamp) is reflected by a document and passed through three mirrors and reduction lenses to the CCD element (image sensor) where images are formed. This system is known as the reduction image sensor system. Photo energy on the CCD element is converted into electrical signals (analog signals). (Photo-electric conversion). The output signals (analog signals) are converted into digital signals (A/D conversion) and passed to the MCU (main control/image process section). The resolution at that time is 400dpi.
The mirror unit in the scanner section is driven by the mirror motor.
The MHPS is provided to detect the home position of the copy lamp unit.

3. Laser unit

The image data sent from the MCU (image process circuit) is sent to the LSU (laser unit), where it is converted into laser beams.

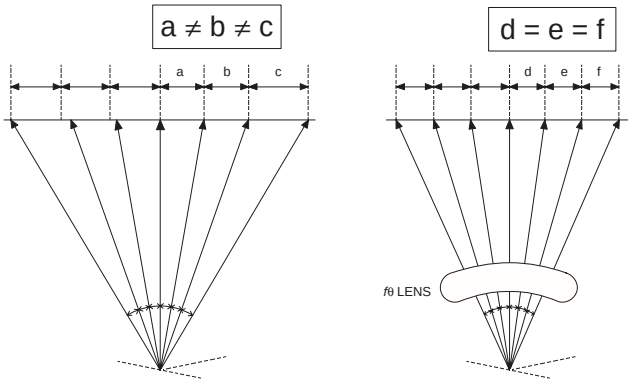
A. Basic structure

The LSU unit is the writing section of the digital optical system.
The semiconductor laser is used as the light source, and images are formed on the OPC drum by the polygon mirror and fθ lens, etc.
The laser beams are passed through the collimator lens, the cylindrical lens, the polygon mirror, the fθ lens, and the mirror to form images on the OPC drum in the main scanning direction. The laser emitting PWB is provided with the APC (auto power control) in order to eliminate fluctuations in the laser power. The BF PWB works for measurement of the laser writing start point.

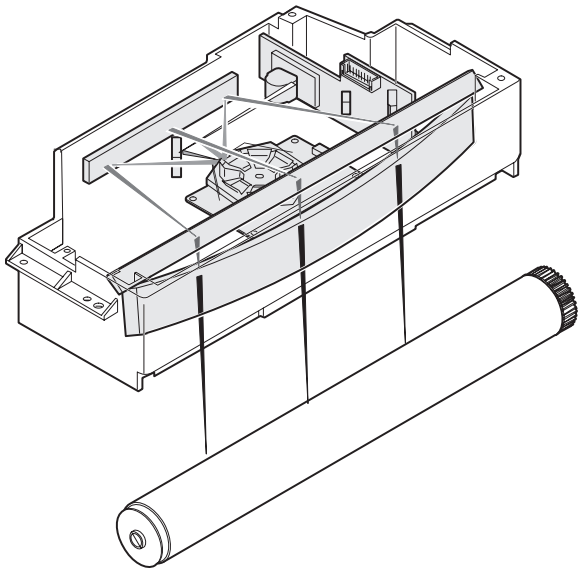


No.	Component	Function
(1)	Semiconductor laser	Generates laser beams.
(2)	Collimator lens	Converges laser beams in parallel.
(3)	Polygon mirror, polygon motor	Reflects laser beams at a constant rpm.
(4)	BD (Mirror, lens, PWB)	Detects start timing of laser scanning.
(5)	fθ lens	Converges laser beams at a spot on the drum.
		Makes the laser scanning speeds at both ends of the drum same as each other. (Refer to the figure below.)

Makes the laser scanning speeds at both ends of the drum same as each other.



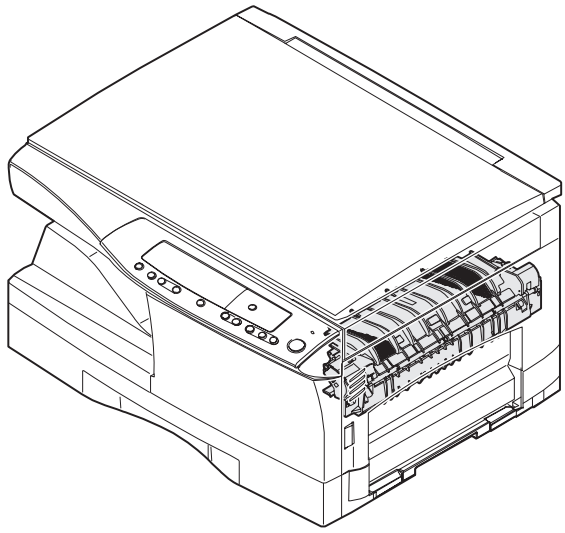
B. Laser beam path



C. Composition

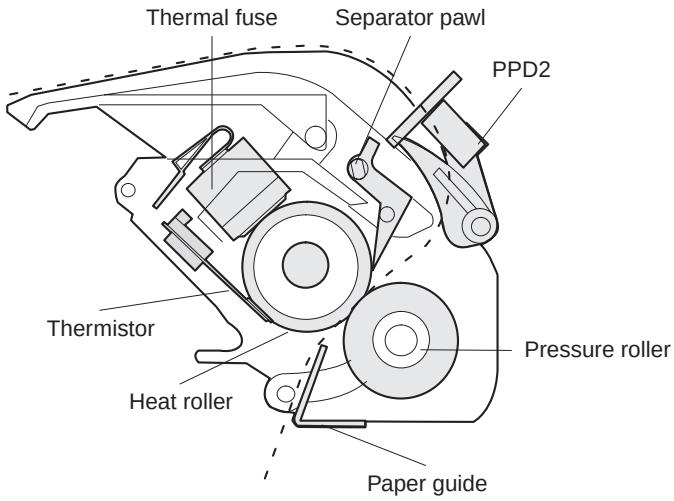
Effective scanning width:	216mm (max.)
Resolution:	600dpi
Beam diameter:	75um in the main scanning direction, 80um in the sub scanning direction
Image surface power:	0.20 ±0.03mW (Laser wavelength 780 – 795nm)
Polygon motor section:	Brushless motor 20.787rpm No. of mirror surfaces: 6 surfaces

4. Fuser section

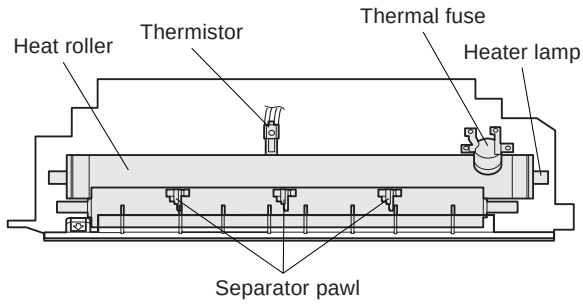


A. General description

General block diagram (cross section)



Top view



(1) Heat roller

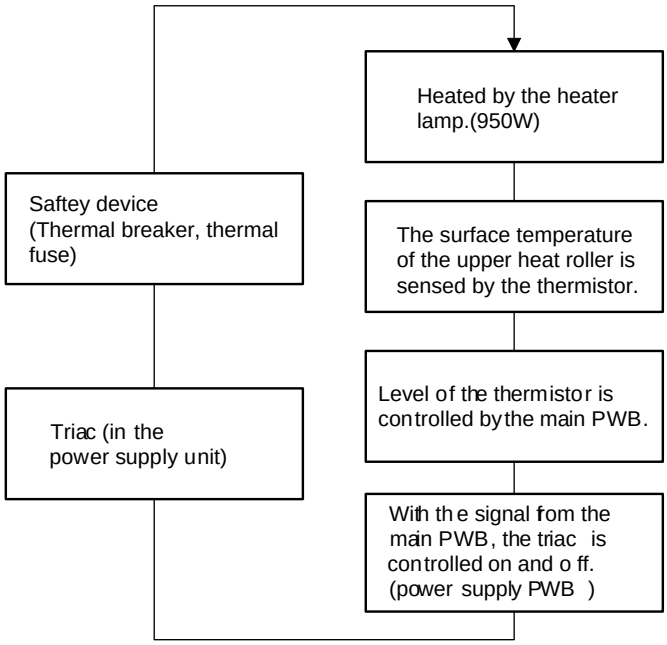
A Teflon roller is used for the heat roller and a silicone rubber roller is used for the lower heat roller for better toner fusing performance and paper separation.

(2) Separator pawl

Three separator pawls are used on the upper heat roller. The separator pawls are teflon coated to reduce friction with the roller and prevent a smear on the paper caused by the separator pawl.

(3) Thermal control

1. The heater lamp, thermistor, main PWB, DC power supply PWB, and triac within the power supply unit are used to control the temperature in the fuser unit.
   To prevent against abnormally high temperature in the fuser unit, a thermal breaker and thermal fuse are used for safety purposes.


Heated by the heater lamp.(950W)
Saftey device (Thermal breaker, thermal fuse)
The surface temperature of the upper heat roller is sensed by the thermistor.
Level of the thermistor is controlled by the main PWB.
Triac (in the power supply unit)
With the signal from the main PWB, the triac is controlled on and off. (power supply PWB)

2. The surface temperature of the upper heat roller is set to 165˚C ~ 190˚C. The surface temperature during the power save mode is set to 100˚C.

3. The self-check function comes active when one of the following malfunctions occurs, and an "H" is displayed on the multicopy window.
   a. When the heat roller surface temperature rises above 240˚C.
   b. When the heat roller surface temperature drops below 100˚C during the copy cycle.
   c. Open thermistor
   d. Open thermal fuse
   e. When the heat roller temperature does not reach 190˚C within 27 second after supplying the power.

(4) Fusing resistor

Fusing resistor

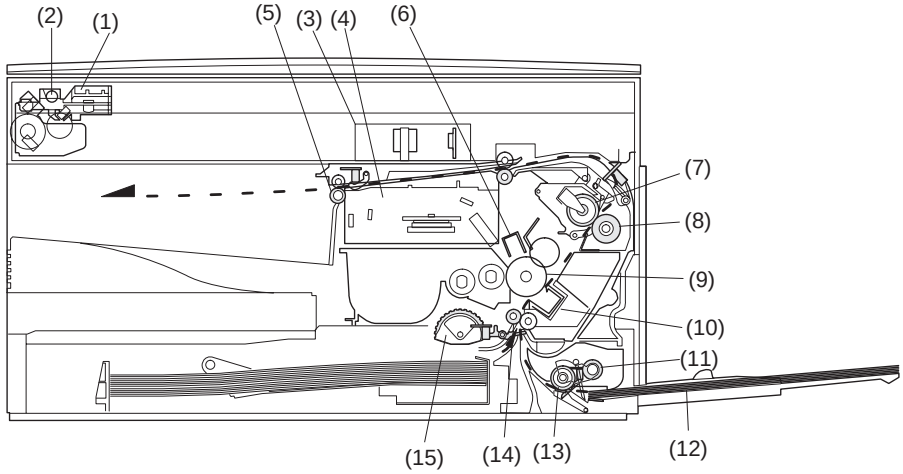
This model is provided with a fusing resistor in the fusing section to improve transfer efficiency.
General descriptions are made in the following.

General descriptions

Since the upper heat roller is conductive when copy paper is highly moist and the distance between the transfer unit and the fusing unit is short, the transfer current leaks through the copy paper, the upper heat roller and the discharging brush.

5. Paper feed section and paper transport section

A. Paper transport path and general operations

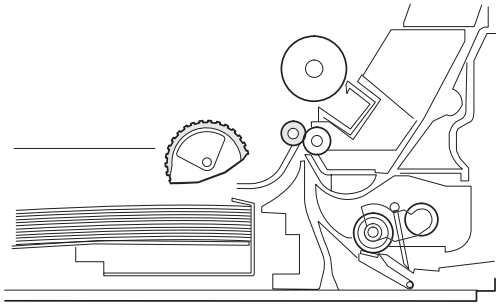


(1)	Scanner unit	(6)	Main charger	(11)	Pickup roller
(2)	Copy lamp	(7)	Heat roller	(12)	Manual paper feed tray
(3)	Lens unit	(8)	Pressure roller	(13)	Manual paper feed roller
(4)	LSU (Laser unit)	(9)	Drum	(14)	PS roller unit
(5)	Paper exit roller	(10)	Transfer unit	(15)	Paper feed roller

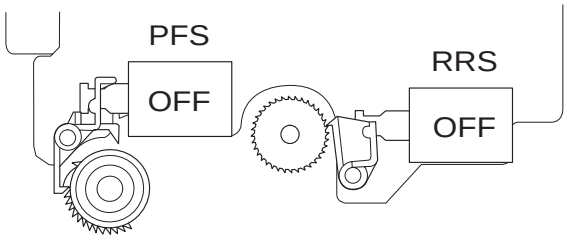
Paper feed is made in two ways; the tray paper feed and the manual paper feed. The tray is of universal-type, and has the capacity of 250 sheets. The front loading system allow you to install or remove the tray from the front cabinet.
The general descriptions on the tray paper feed and the manual paper feed are given below.

(1) Cassette paper feed operation

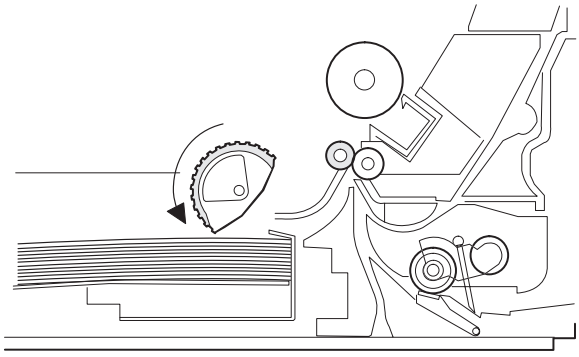
1) The figure below shows the positions of the pick-up roller, the paper feed clutch sleeve, and the paper feed latch in the initial state without pressing the COPY button after lighting the ready lamp.
The paper feed latch is in contact with the projection of the clutch sleeve.

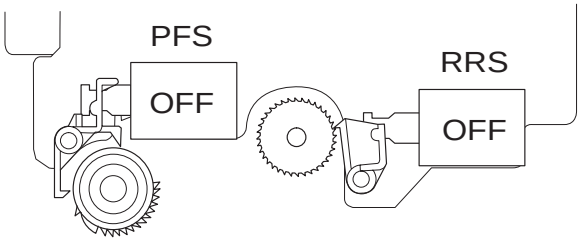


2) When the COPY button is pressed, the main drive motor starts rotating to drive each drive gear.
The pick-up drive gear also is driven at that time. Since, however, the paper feed latch is in contact with the projection of the clutch sleeve, rotation of the drive gear is not transmitted to the pick-up roller, which does not rotate.



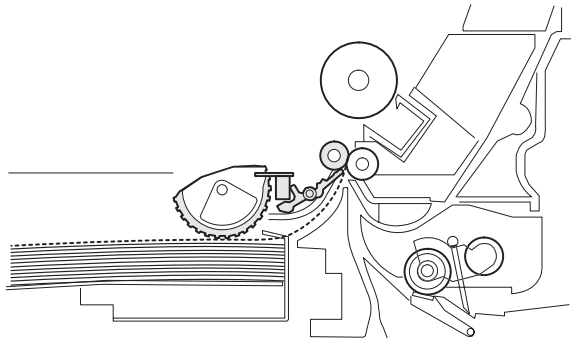
3) After about 0.1 sec from when the main motor start rotating, the tray paper feed solenoid (PFS) turns on momentarily.
This disengages the paper feed latch from the projection of the clutch sleeve, transmitting rotation of the pick-up drive gear to the paper feed roller shaft, rotating the pick-up roller to feed the paper.

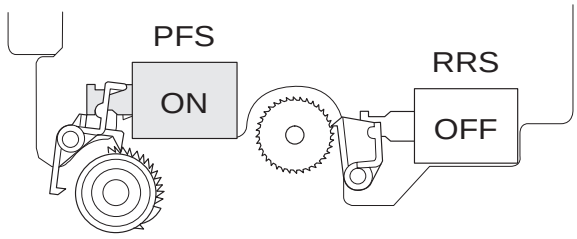




4) After more than half rotation of the pick-up roller, the paper feed latch is brought in contact with the projection of the clutch sleeve, stopping rotation of the pick-up roller.

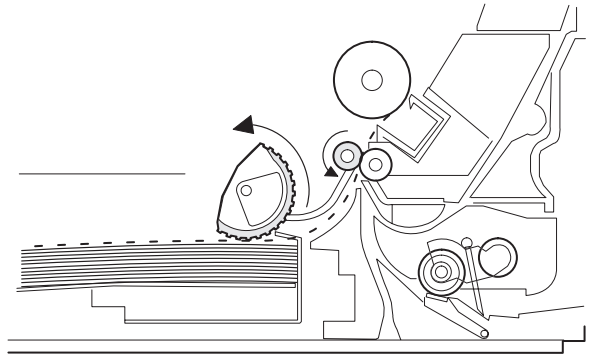
5) At this time, the paper is fed past the paper entry detection switch (PPD1), and detected by it. After about 0.15 sec from detection of paper by PPD1, the tray paper feed solenoid (PFS) turns on so that the clutch sleeve projection comes into contact with the paper feed latch to stop the pick-up roller. Then the pick-up roller rotates for about 0.15 sec so that the lead edge of the paper is evenly pressed on the resist roller, preventing against skew feeding.

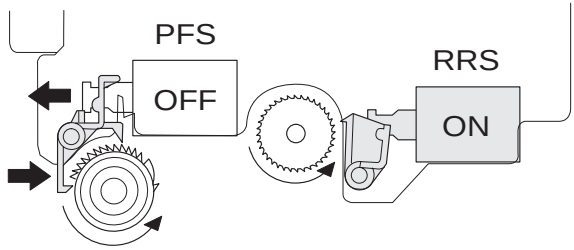




6) To release the resist roller, the tray paper feed solenoid and the resist solenoid are turned on by the paper start signal to disengage the resist start latch from the clutch sleeve projection, transmitting rotation of the resist drive gear to the resist roller shaft. Thus the paper is transported by the resist roller.

7) After the resist roller starts rotating, the paper is passed through the pre-transfer guide to the transfer section. Images are transferred on the paper, which is separated from the OPC drum by the drum curve and the separation section.

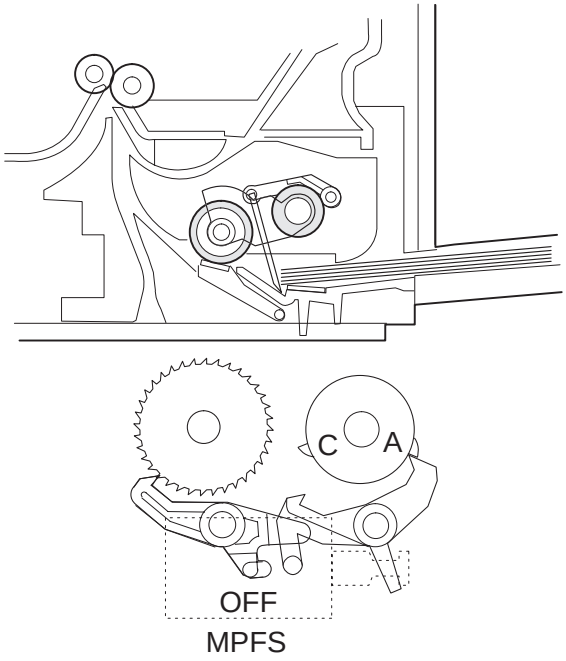




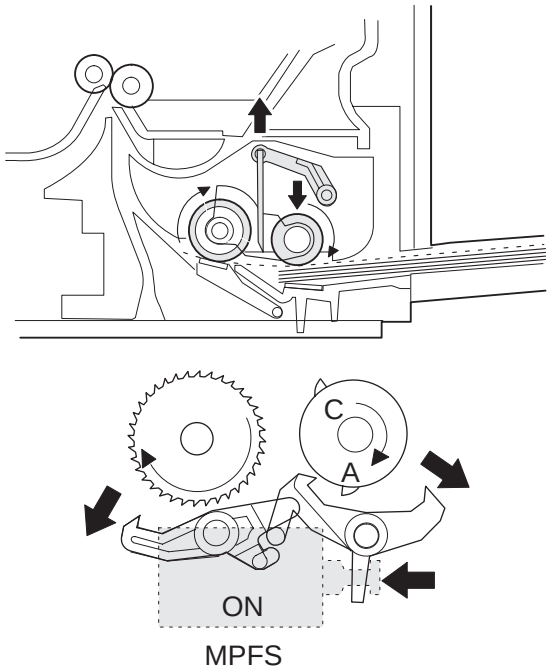
8) The paper separated from the drum is passed through the fusing paper guide, the heat roller (fusing section), POD (paper out detector) to the copy tray.

(2) Manual multi paper feed operation

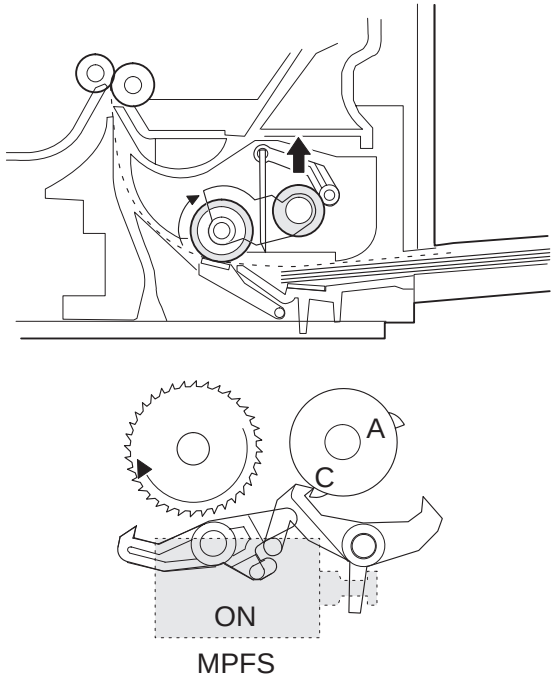
1) Before paper feed operation, the manual paper feed solenoid (MPFS) is turned OFF as shown in the figure below.



2) When the PRINT button is pressed, the manual paper feed solenoid (MPFS) turns on to disengage the manual paper feed latch A from the manual paper feed clutch sleeve A, rotating the manual paper feed roller and the manual take-up roller. At the same time, the manual paper feed stopper opens and the manual take-up roller is pressed to the surface of the paper to start paper feeding.

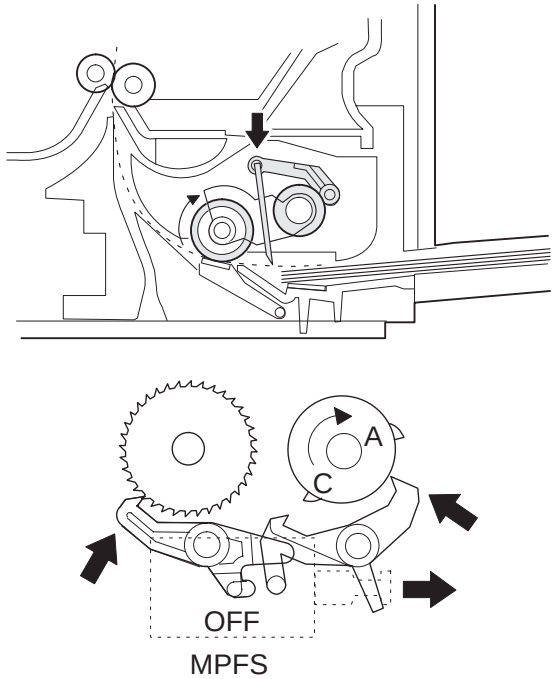


3) When pawl C of the manual paper feed clutch sleeve is hung on the manual feed latch, the manual feed stopper falls and the manual take-up roller rises. At that time, the manual paper feed roller is rotating.



4) The lead edge of the transported paper is pressed on the resist roller by the transport roller. Then the paper is stopped temporarily to make synchronization with the lead edge of the image on the OPC drum.
The operations hereinafter are the same as the paper feed operations from the tray. (Refer to A-5 ~ 8.)

5) The solenoid turns off to close the gate and return to the initial state.



(3) Conditions of occurrence of paper misfeed

a. When the power is turned on:
PPD or POD is ON when the power is turned on.

b. Copy operation

a. PPD1 jam
1) PPD1 does not turn off within 4 sec after turning on the resist roller.

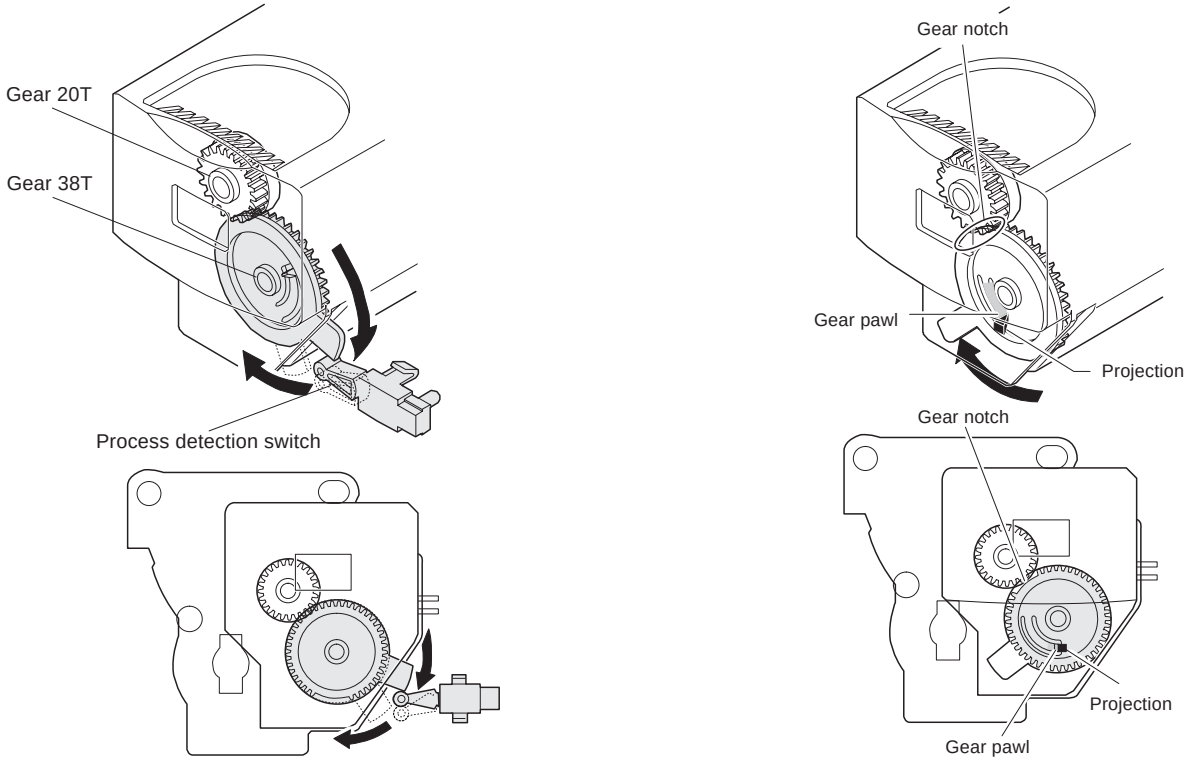
b. PPD2 jam
1) PPD2 is off immediately after turning on the resist roller.
2) PPD2 does not turn off within 1.2 sec after turning off the resist roller.

c. POD jam
1) POD does not turn on within 2.9 sec after turning on the resist roller.
2) POD does not turn off within 1.5 sec ~ 2.7 sec after turning off PPD2.

6. Process unit new drum detection mechanism

1) When the power is turned on, the detection gear 38T is rotated in the arrow direction by the detection gear 20T to push the micros-witch (process detection switch) installed to the machine sensor cover, making a judgement as a new drum.

2) When the detection gear 38T turns one rotation, there is no gear any more and it stops.
The latch section of the 38T gear is latched and fixed with the projection of the process cover.

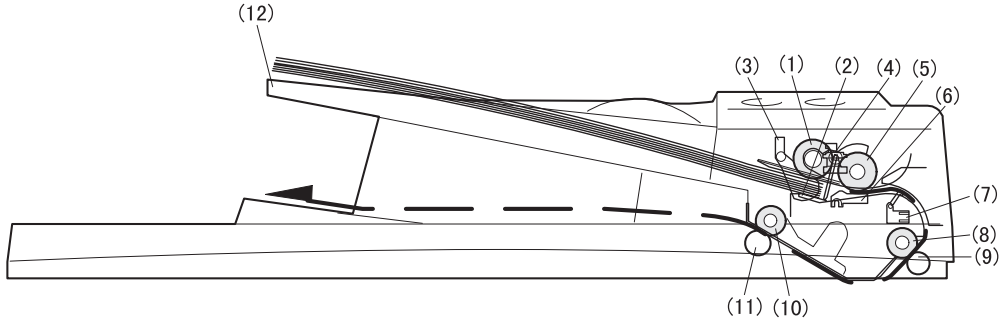


7. FAX-SPF section (AR-F152 only)

A. Outline

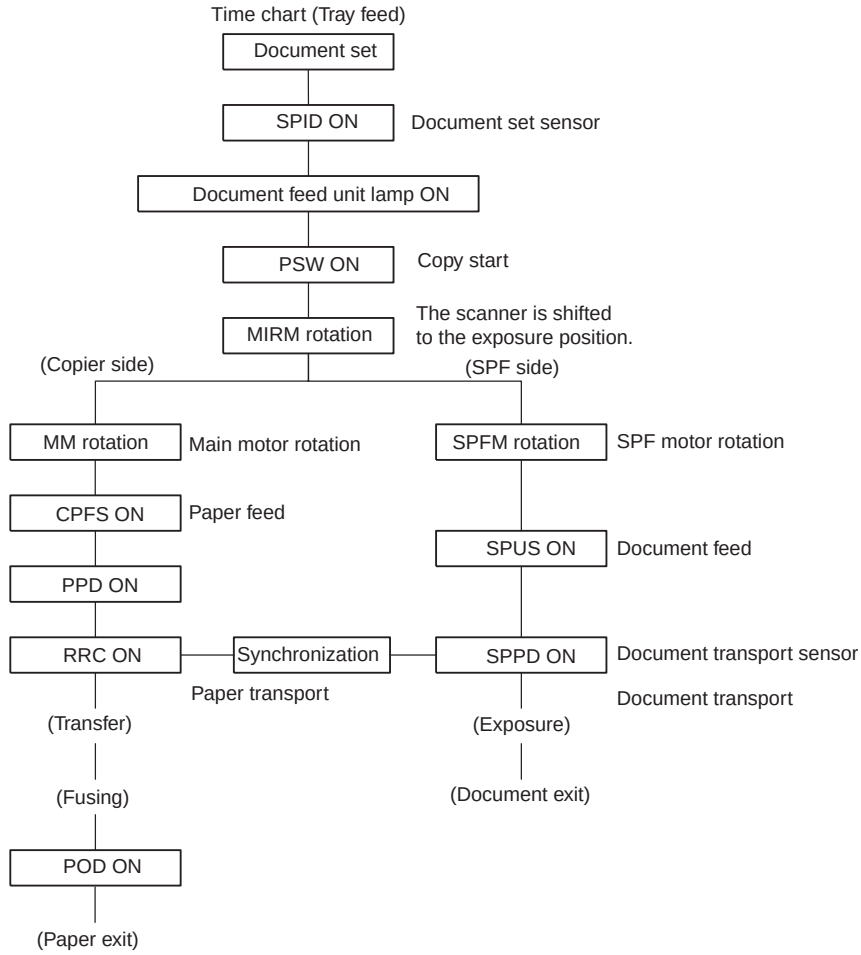
The SPF (Single Path Feeder) is installed to the AR-F152 as a standard provision, and it automatically copies up to 30 sheets of documents of a same size. (Only one set of copies)

B. Document transport path and basic composition

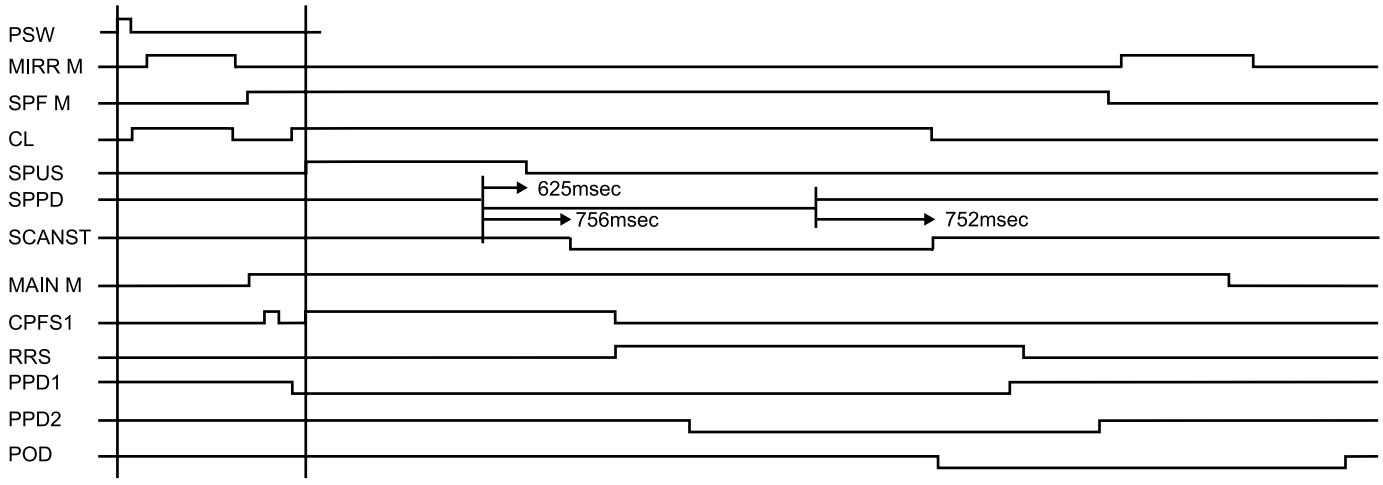


(1)	Pickup roller	(2)	Sheet of document for paper feed	(3)	Set detection ACT
(4)	Paper stopper	(5)	Document feed roller	(6)	Separation sheet
(7)	Paper entry sensor	(8)	PS roller D	(9)	Transport follower roller
(10)	Paper exit roller	(11)	Paper exit follower roller	(12)	Document tray

C. Operational descriptions



In the zooming mode, the magnification ratio in the sub scanning direction (paper transport direction) is adjusted by changing the document transport speed.



D. Cases where a document jam is caused

a. When SPPD is ON (document remaining) when the power is turned on.
b. When SPPD is not turned ON within about 1.5 sec (at 100% copy) after starting the document feed operation.
c. When SPPD is not turned on within about 4.7 sec (at 100% copy) after turning on SPPD.
d. When the SPF document jam release door or the OC cover is opened during document transport (SPF motor rotating).

8. D-D (Duplex to Duplex) mode paper/document transport (AR-156 only)

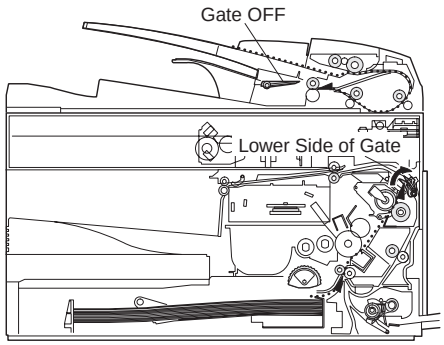
A. Initial state

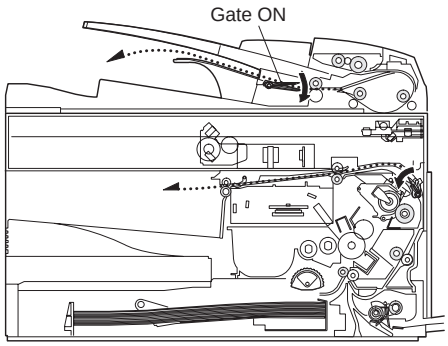
Set duplex documents on the document tray.
Set paper on the cassette. (In the duplex mode, the manual feed tray cannot be selected.)

B. Front copy

Document transport: The document feed roller feeds the document from the paper feed roller to the PS roller.
→ The document is exposed in the exposure section, and sent to the document exit section by the transport/paper exit roller.
→ R-SPF gate solenoid ON
→ The document is sent to the intermediate tray (but not discharged completely.)
→ The document is stopped once, then switchback operation is performed. (To the back copy)

Paper transport: The document is passed through the paper feed roller and the PS roller by the paper feed roller and the images on the front surface are transferred.
→ The paper is passed through the fusing section and the lower side of the gate section to the paper exit tray side, (but not discharged completely.)
→ It is stopped once and switchback operation is performed. (To the back copy)

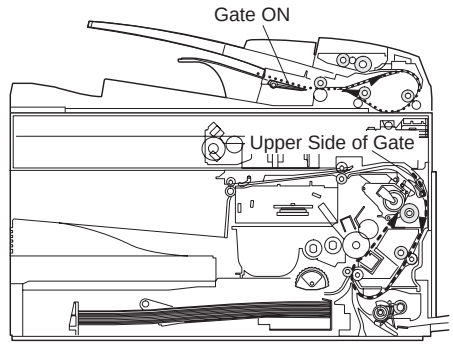


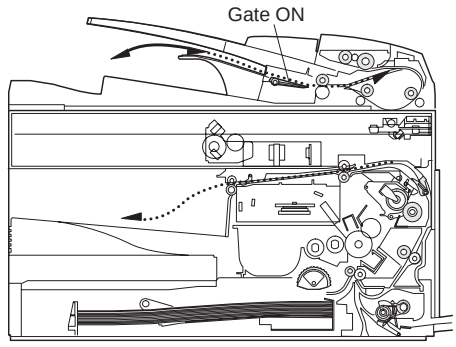


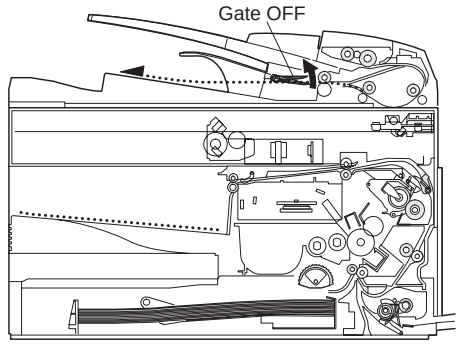
C. Back copy

Document transport: By switchback operation, the document is sent through the PS roller to the exposure section, where the back of the document is exposed.
→ It is sent to the document exit section by the transport roller and the paper exit roller.
→ R-SPF gate solenoid ON. The document is sent to the intermediate tray, (but not discharged completely.)
→ It is stopped once and switchback operation is performed.
→ It is sent through the PS roller and the exposure section (without exposure operation) to the document exit section.
→ R-SPF gate solenoid OFF
→ The document is discharged to the document exit tray.

Paper transport: Switchback operation is performed.
→ The paper is sent through the upper side of the gate section and the duplex transport section, and the PS roller, and the images on the back are transferred.
→ It is sent through the fusing section and discharged to the paper exit tray.







Switchback operation is made after back copying in order to discharge documents according to the setting.

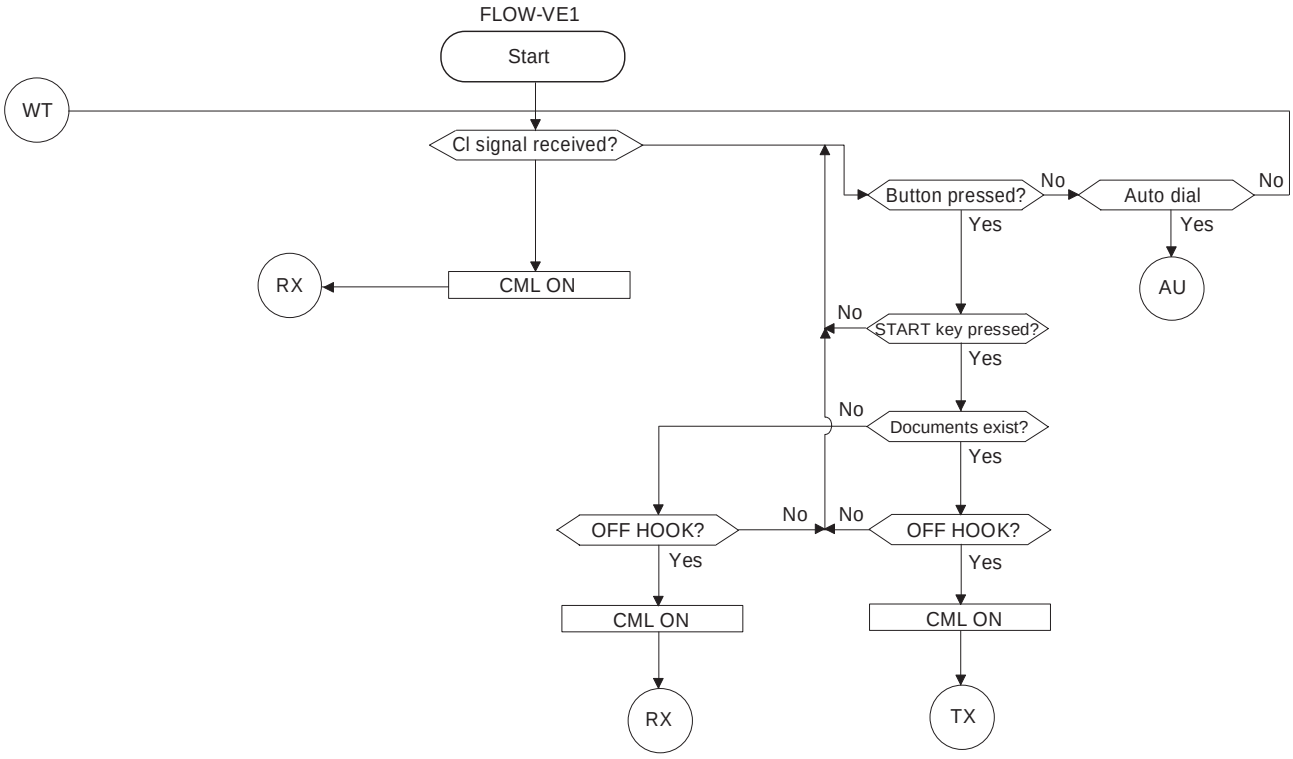
Set document	Documents after discharge,	
$\frac{1}{2}$	with empty feed $\frac{4}{3}$	without empty feed $\frac{3}{4}$
$\frac{3}{4}$	$\frac{2}{1}$	$\frac{1}{2}$

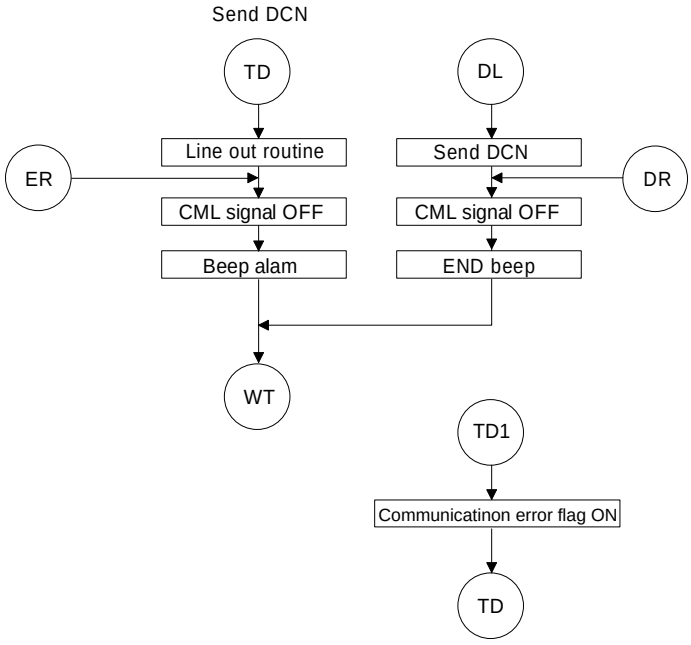
There are following job modes as well as D-D mode.

S - S (Simplex to Simplex)
S - D (Simplex to Duplex), Rotation copy mode (The back images are rotated 180˚.)
S - D (Simplex to Duplex), Copy mode without rotation
D - S (Duplex to Simplex)

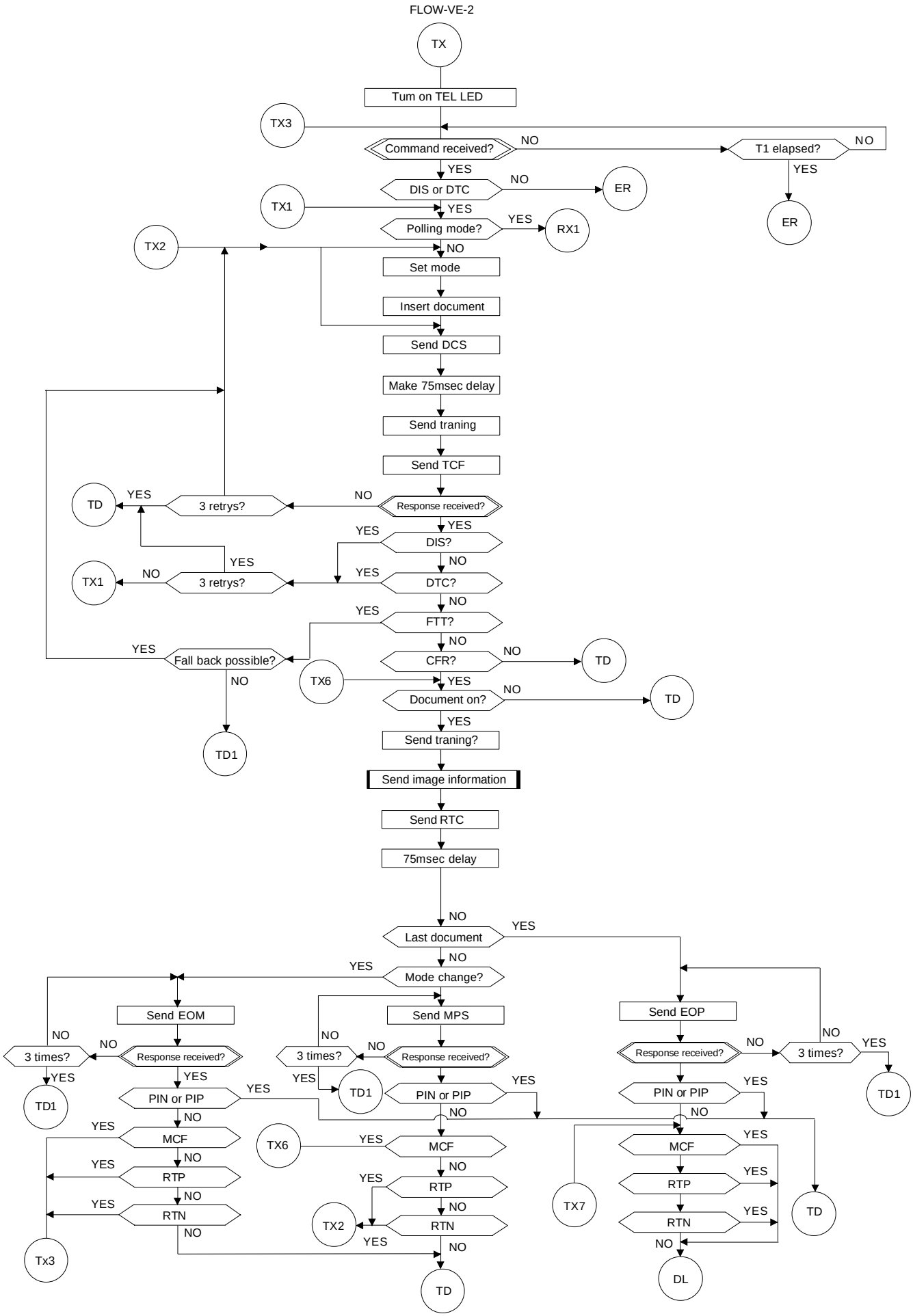
Rotation copy mode:
The front and the back are upside down to each other.
Copy mode without rotation:
The front and the back are not upside down.

9. FAX-OPERATION FLOWCHART (AR-F152 only)

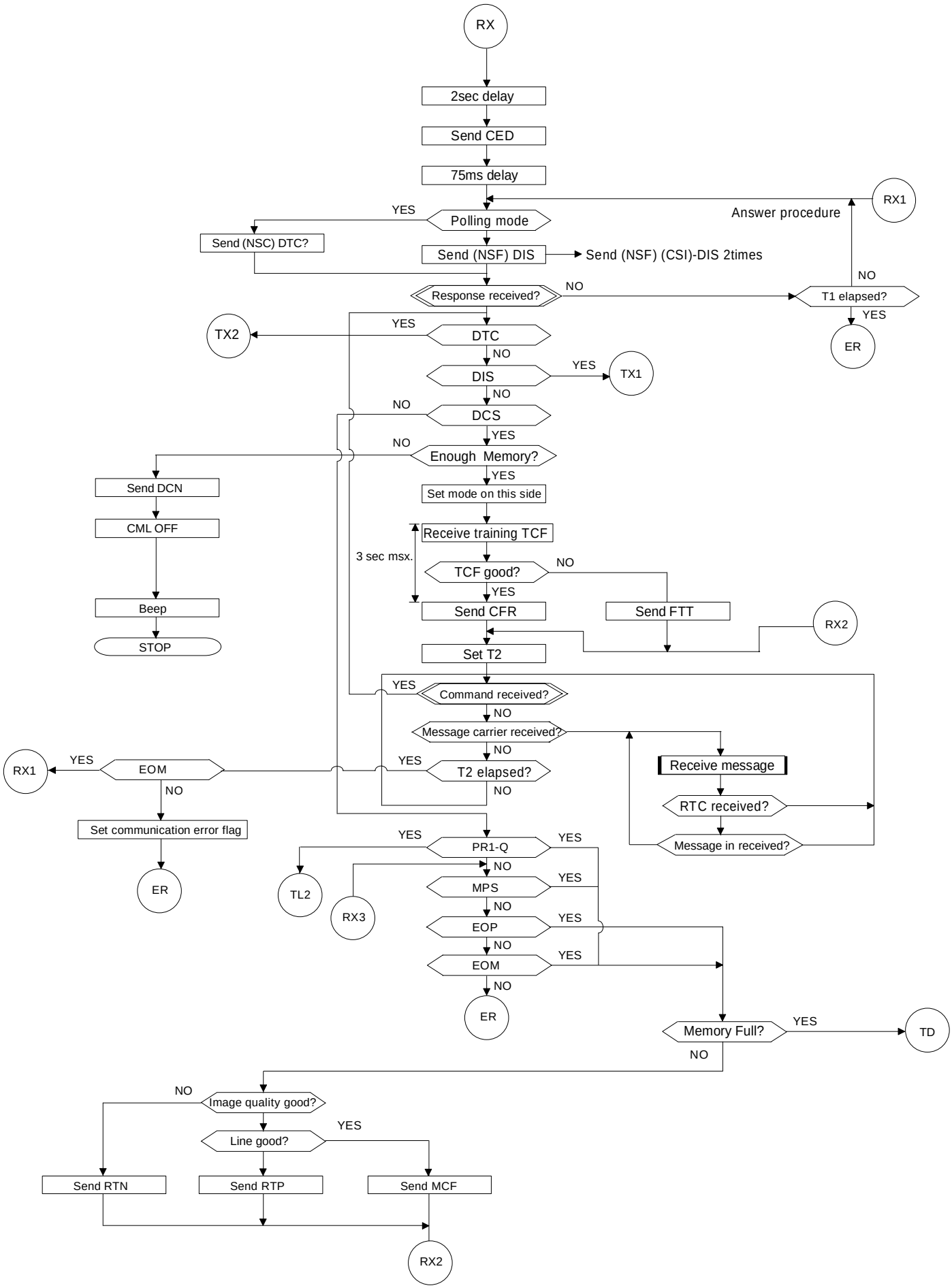




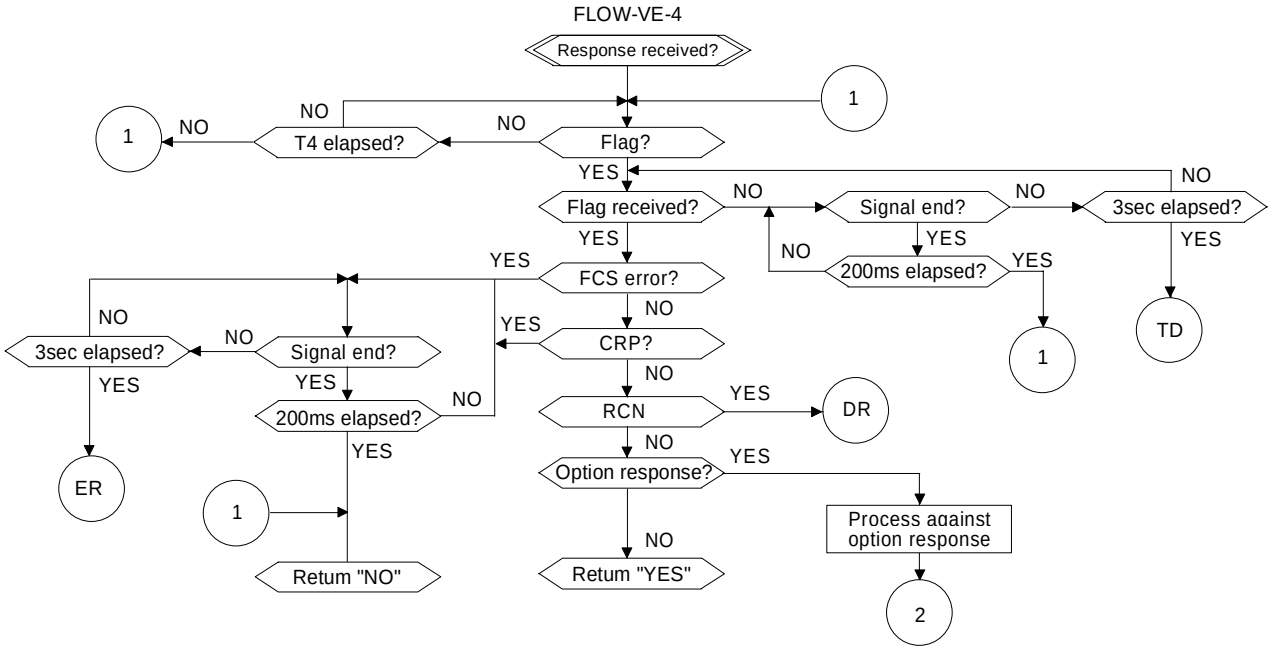
FLOW-VE-2

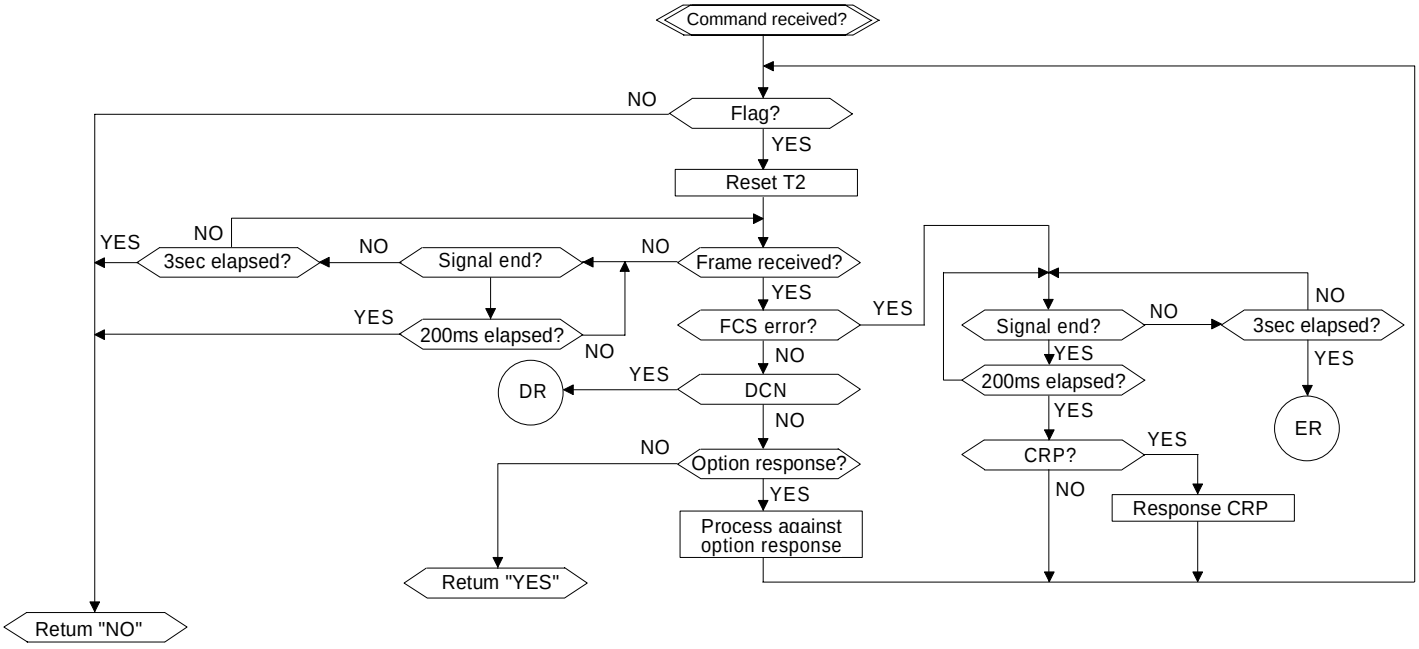

TX
Tum on TEL LED
TX3
Command received?
NO
T1 elapsed?
NO
YES
YES
DIS or DTC
NO
ER
TX1
YES
Polling mode?
YES
RX1
ER
TX2
NO
Set mode
Insert document
Send DCS
Make 75msec delay
Send traning
Send TCF
TD
YES
3 retrys?
NO
Response received?
YES
YES
DIS?
NO
TX1
NO
3 retrys?
YES
YES
DTC?
NO
YES
FTT?
NO
YES
Fall back possible?
CFR?
NO
TD
TX6
YES
Document on?
NO
TD
NO
YES
TD1
Send traning?
Send image information
Send RTC
75msec delay
NO
Last document
YES
NO
YES
Mode change?
Send EOM
Send MPS
Send EOP
NO
3 times?
NO
Response received?
NO
3 times?
NO
Response received?
Response received?
NO
3 times?
YES
YES
YES
YES
YES
TD1
PIN or PIP
YES
TD1
PIN or PIP
YES
PIN or PIP
YES
TD1
NO
NO
NO
YES
MCF
TX6
YES
MCF
YES
MCF
NO
NO
NO
YES
RTP
YES
RTP
YES
RTP
NO
NO
NO
YES
RTN
TX2
YES
RTN
TX7
YES
RTN
TD
NO
NO
NO
Tx3
TD
DL

FLOW-VE-3

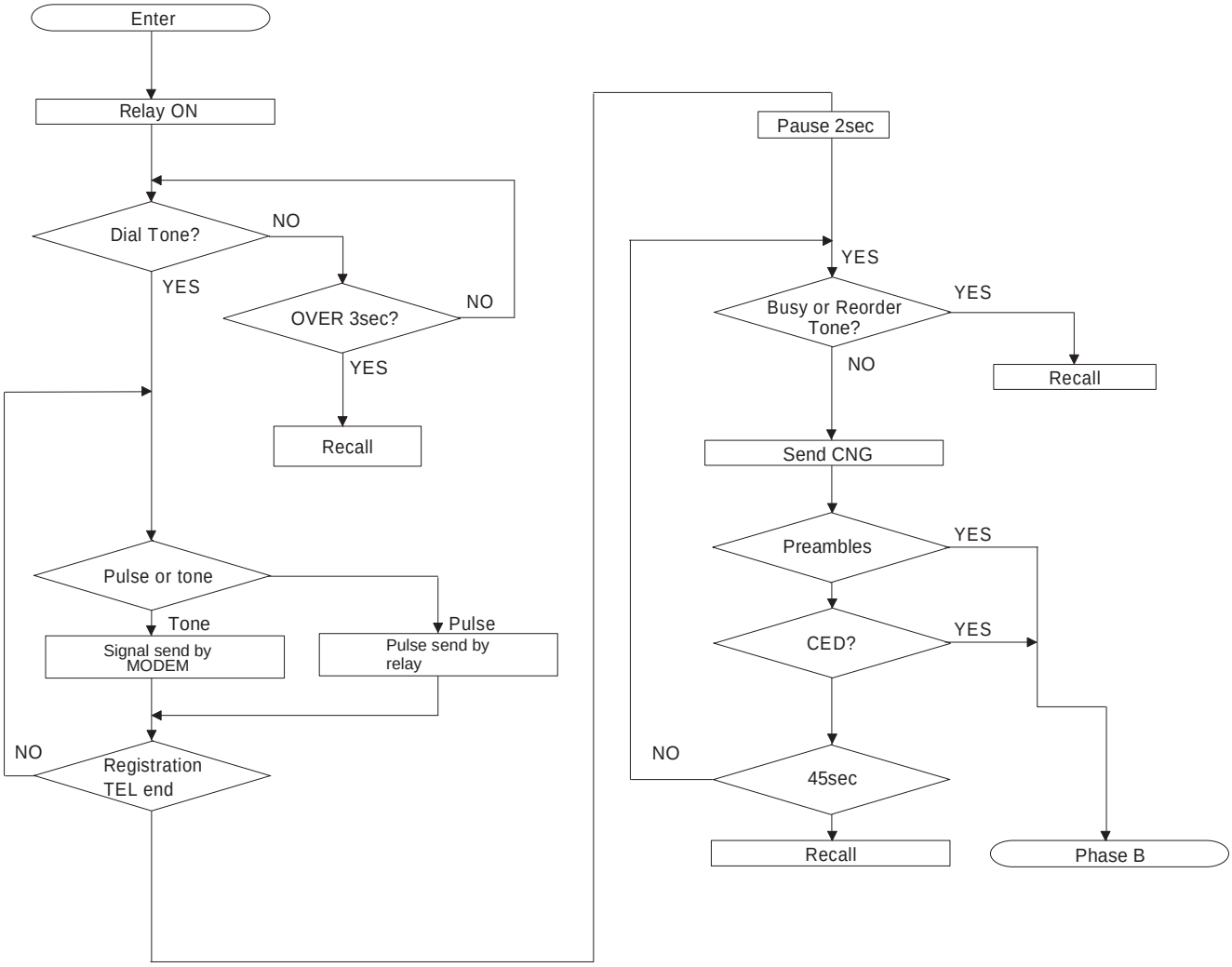

RX
2sec delay
Send CED
75ms delay
RX1
YES
Polling mode
Answer procedure
Send (NSC) DTC?
Send (NSF) DIS
Send (NSF) (CSI)-DIS 2times
NO
Response received?
NO
T1 elapsed?
YES
ER
TX2
YES
DTC
NO
DIS
YES
TX1
NO
DCS
YES
NO
Enough Memory?
YES
Send DCN
Set mode on this side
CML OFF
Receive training TCF
3 sec msx.
TCF good?
NO
YES
Beep
Send CFR
Send FTT
RX2
STOP
Set T2
YES
Command received?
NO
Message carrier received?
NO
RX1
YES
EOM
YES
T2 elapsed?
Receive message
NO
NO
RTC received?
Set communication error flag
Message in received?
YES
PR1-Q
YES
ER
NO
TL2
YES
MPS
RX3
NO
YES
EOP
NO
YES
EOM
NO
ER
Memory Full?
YES
TD
NO
NO
Image quality good?
YES
Line good?
Send RTN
Send RTP
Send MCF
RX2

FLOW-VE-4


Response received?
1
1
NO
T4 elapsed?
NO
Flag?
YES
Flag received?
NO
Signal end?
NO
3sec elapsed?
YES
YES
YES
NO
200ms elapsed?
YES
1
TD
YES
FCS error?
NO
NO
3sec elapsed?
NO
Signal end?
YES
CRP?
YES
NO
YES
200ms elapsed?
NO
RCN
YES
DR
NO
YES
Option response?
YES
ER
1
Process against option response
NO
Retum "NO"
Retum "YES"
2


Command received?
NO
Flag?
YES
Reset T2
YES
NO
3sec elapsed?
NO
Signal end?
NO
Frame received?
YES
YES
200ms elapsed?
NO
FCS error?
YES
NO
DR
YES
DCN
NO
NO
Option response?
YES
Process against option response
Retum "YES"
Retum "NO"
Signal end?
NO
3sec elapsed?
YES
YES
200ms elapsed?
YES
CRP?
YES
NO
Response CRP
ER

Auto dial sending



[7] DISASSEMBLY AND ASSEMBLY

Before disassembly, be sure to disconnect the power cord for safety. The disassembly and assembly procedures are described for the following sections:

1. High voltage section
2. Operation panel section
3. Optical section
4. Fusing section
5. Tray paper feed/transport section
6. Manual paper feed section
7. Rear frame section
8. Power section
9. SPF section
10. 2nd cassette section
11. DUP motor section
12. Reverse roller section
13. RSPF section
14. FAX MCU PWB section
15. FAX-SPF section

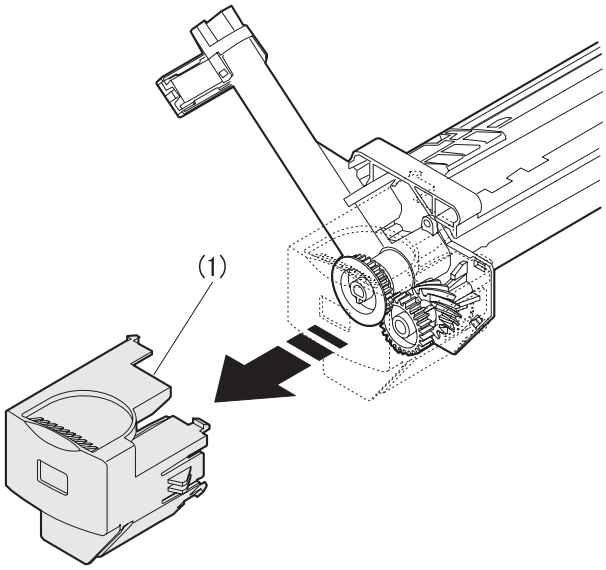
1. High voltage section

A. List

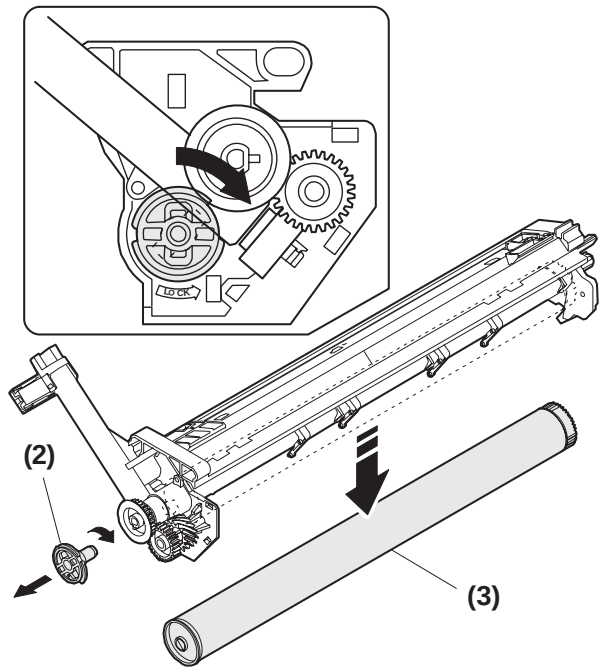
No.	Part name Ref.
1	Drum
2	Transfer charger unit
3	Charger wire

B. Drum replacement

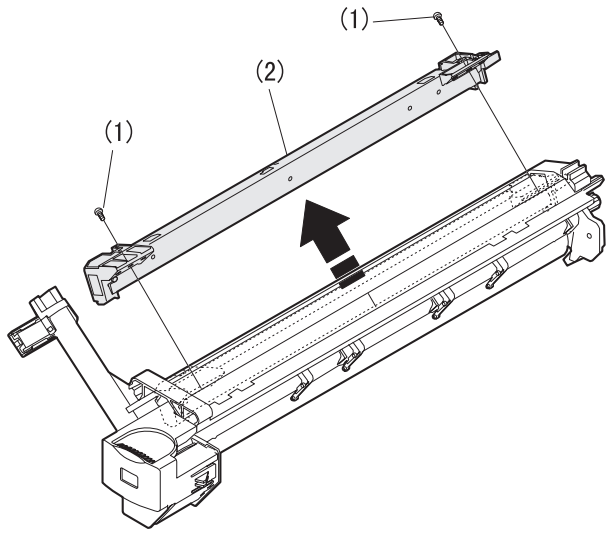
1) Remove the drum cover. (4 Lock Tabs)



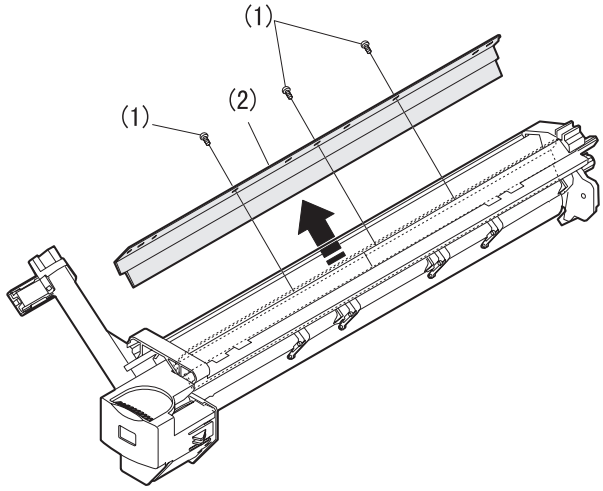
2) Remove the drum fixing plate and the photoconductor drum.
(Note) Dispose the drum fixing plate which was removed.



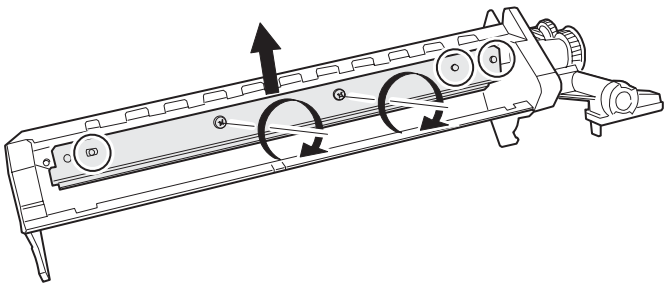
3) Check the cleaning blade and the red felt for no damage.
   - If there is any damage, execute all procedures from item 5) and later.
   - If there is no damage, execute the procedure of item 12).
4) Remove the main charger.
(Cleaning the screen grid and the sawteeth.)



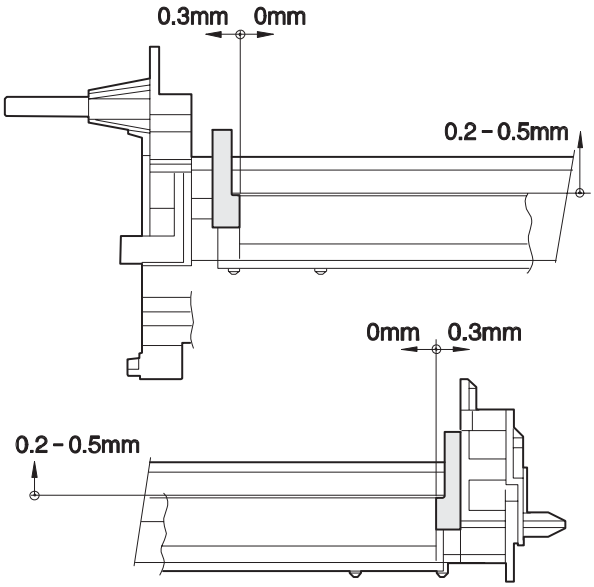
5) Remove the cleaning blade.
Note: Dispose the cleaning blade which was removed.



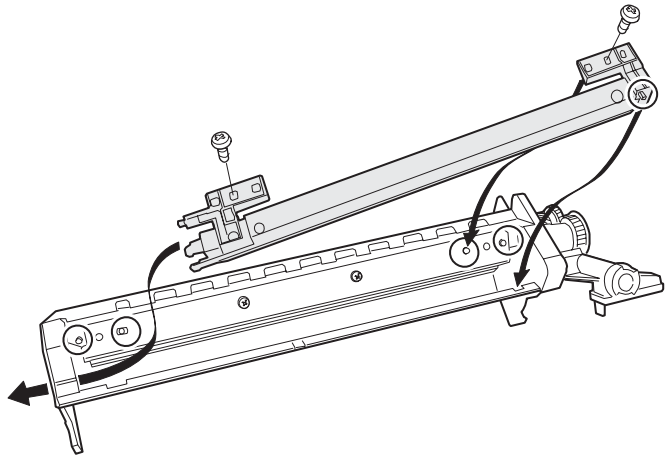
6) Clean the cleaning section and the waste toner pipe to remove waste toner completely with a vacuum cleaner.
7) Remove the felt and duplex tape completely.
Note: Be careful not to scratch or bend the sub blade.
8) Attach the cleaning blade.
Securely insert the plate section of the cleaning blade into the unit and fix it with a screw.
Do not touch the cleaning blade rubber with your hand.
When attaching the cleaning blade, press the cleaning blade in the arrow direction and attach.



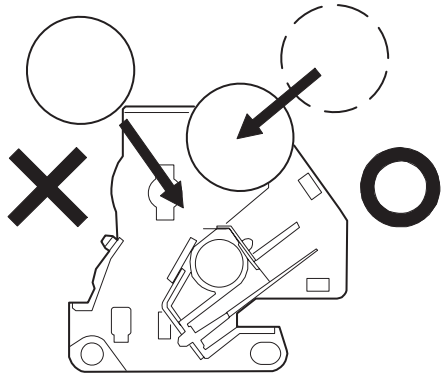
9) Attach the felt.

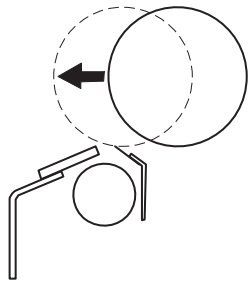


Attach the mocket with slightly pressing section A of the cleaning blade.
Do not touch the tip of the cleaning blade.
Do not put the mocket under the cleaning blade.
Do not put the mocket on the sub blade.
Do not press the sub blade with the mocket.
10) Attach the main charger.
Securely set the MC holder on the projection of the process frame.
Securely insert two projections of the MC holder into the groove in the process frame.
When attaching the MC holder ass'y, be careful not to make contact with the cleaning blade.



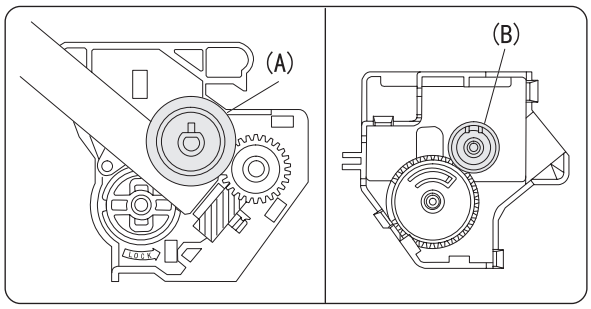
11) Attach the drum fixing plate and the photoconductor drum.
Apply grease to the inside of the photoconductor drum. (Dia. 2)





Attach the drum from (b). (Prevention against the sub blade edge breakage)
Attach the drum so that its position with the sub blade is as shown.

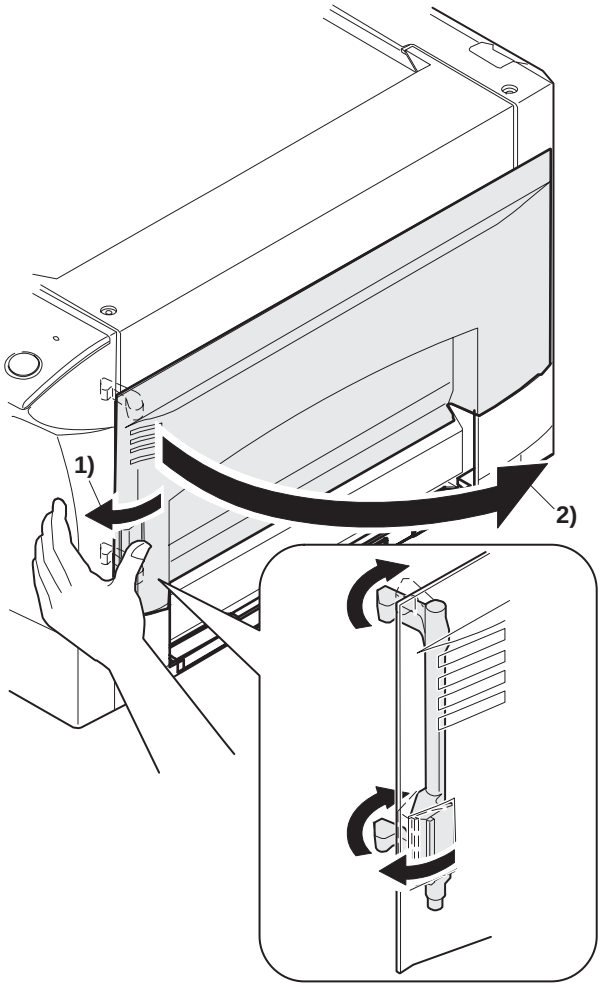
12) Attach the detection gear.
Note:
- The detection gear is not installed to the drum cartridge packed with the main body. Add a new one.



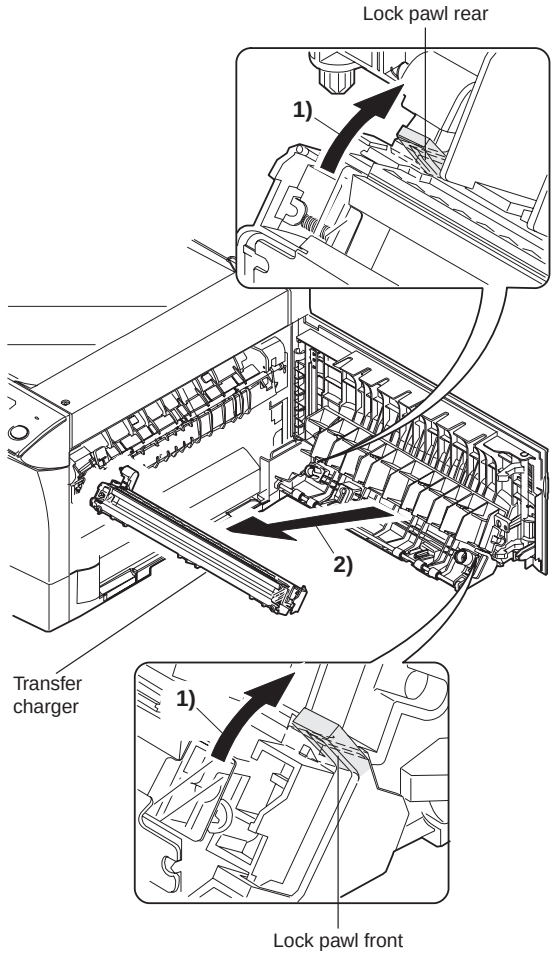
13) Attach the drum cover.
Note: After attaching the drum cover, do not make a copy.
When attaching the drum cover, engage the detection gear 20T rib with the 30T gear rib, and attach the drum cover to the process frame.

C. Disassembly procedure

(1) Press the side cover open/close button and open the side cover.



(2) Push up the lock pawls (2 positions) of the side cover, and remove the transfer charger.

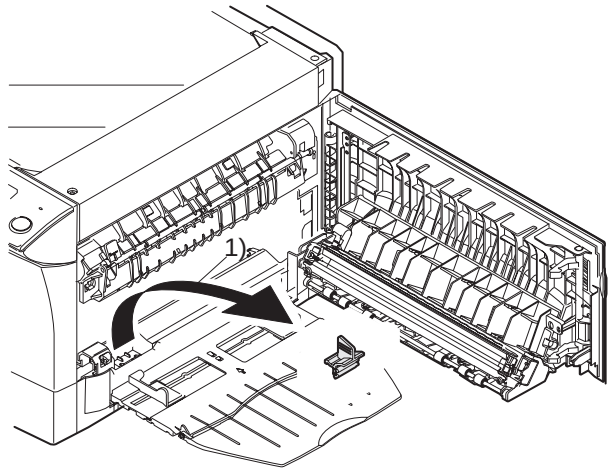


D. Assembly procedure

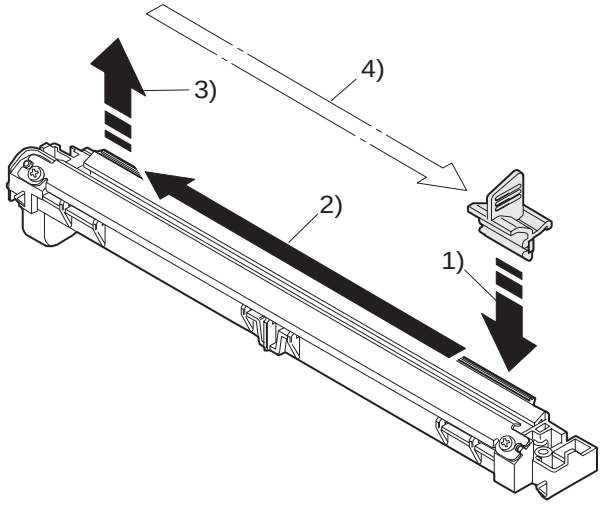
For assembly, reverse the disassembly procedure.

E. Charger wire cleaning

(1) Remove the charger cleaner from the manual paper feed unit.

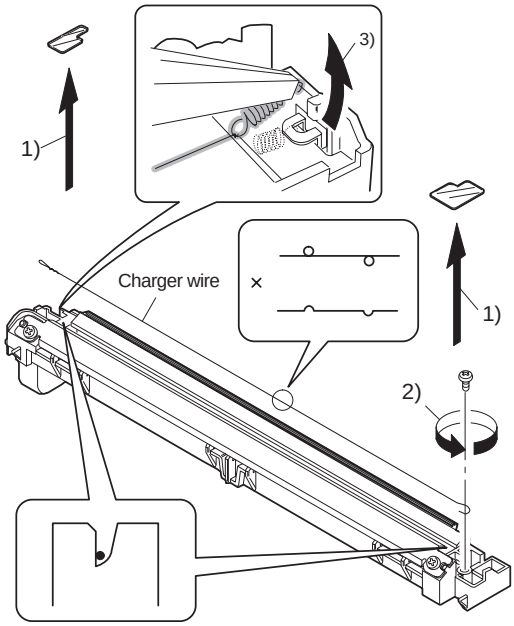


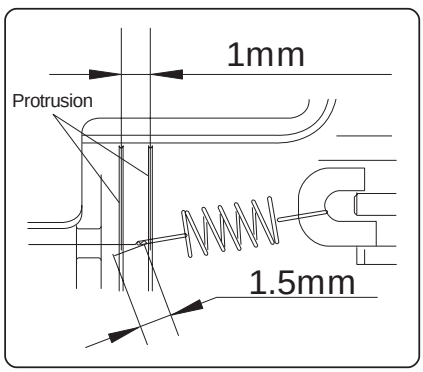
(2) Set the charger cleaner to the transfer unit, and move it reciprocally a few times in the arrow direction shown in the figure below.



F. Charger wire replacement

(1) Remove the TC cover and remove the screw.
(2) Remove the spring and remove the charger wire.
(3) Install a new charger wire by reversing the procedures (1) and (2). At that time, be careful of the following items.
- The rest of the charger wire must be within 1.5mm.
- The spring hook section (charger wire winding section) must be in the range of the projection section.
- Be careful not to twist the charger wire.





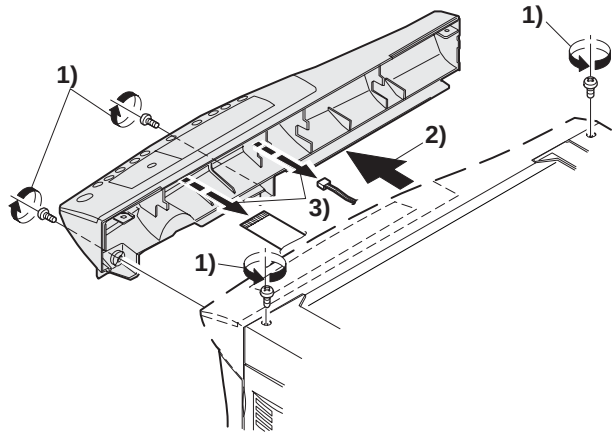
2. Operation panel section

A. List

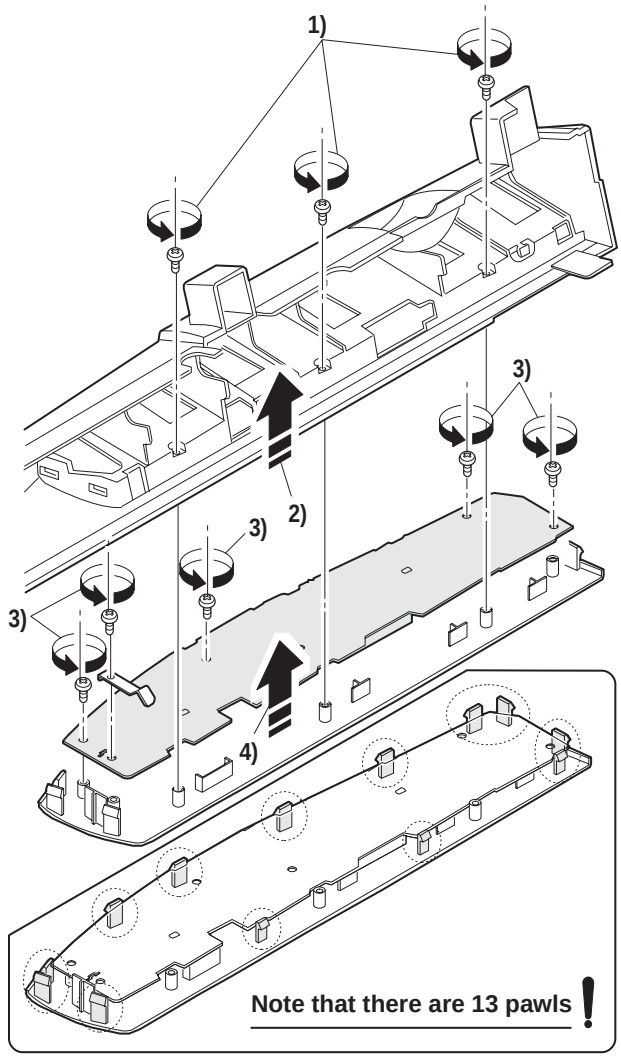
No.	Part name Ref.
1	Operation panel unit
2	Operation PWB

B. Disassembly procedure

(1) Remove the screws (4 pcs.), the harness, and the operation panel unit.



(2) Remove the screws (3 pcs.) and the PWB holder.
(3) Remove the screws (3 pcs.) and the operation PWB.



C. Assembly procedure

For assembly, reverse the disassembly procedure

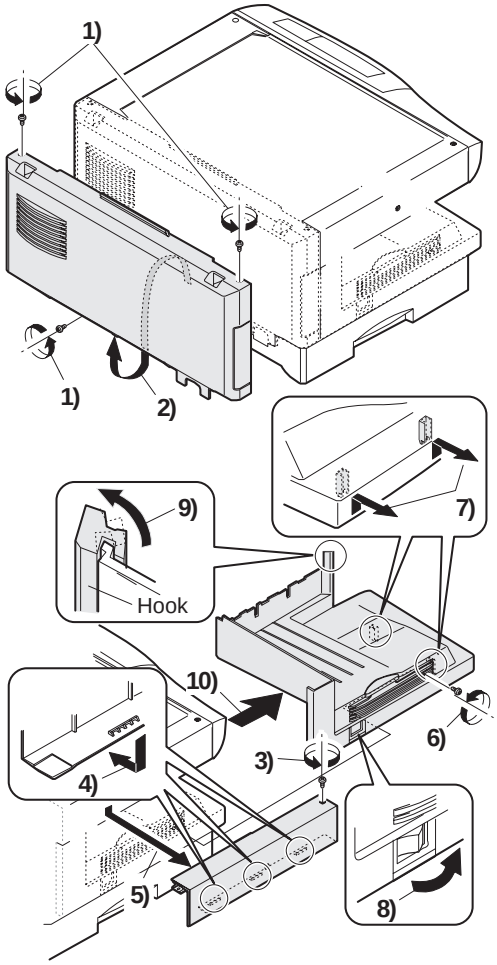
3. Optical section

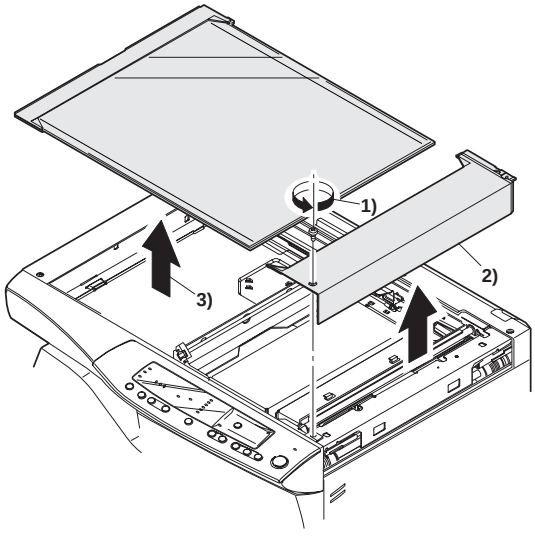
A. List

NO.	Part name Ref.
1	Copy lamp unit
2	Copy lamp
3	Lens unit

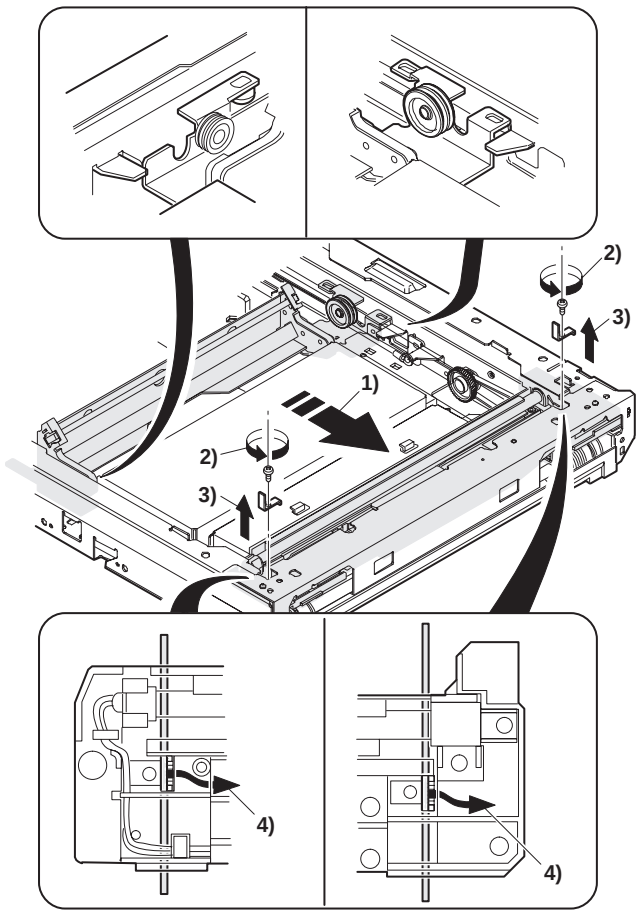
B. Disassembly procedure

(1) Remove the parts as shown below.

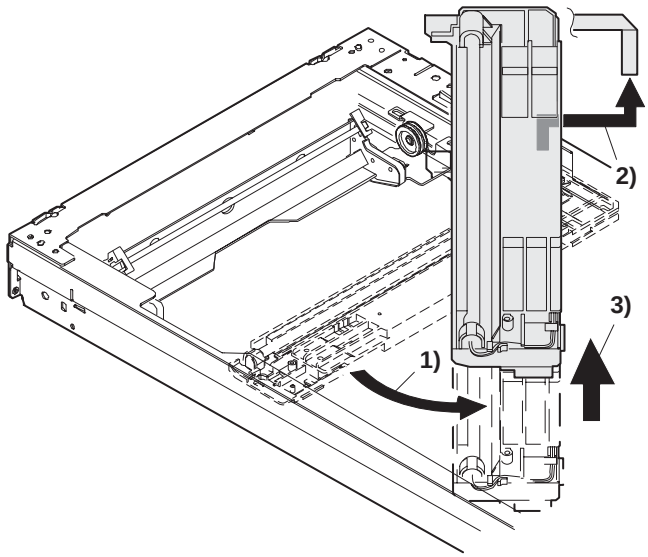




(2) Remove the screws (2pcs.), and remove the copy lamp unit from the mirror base drive wire.

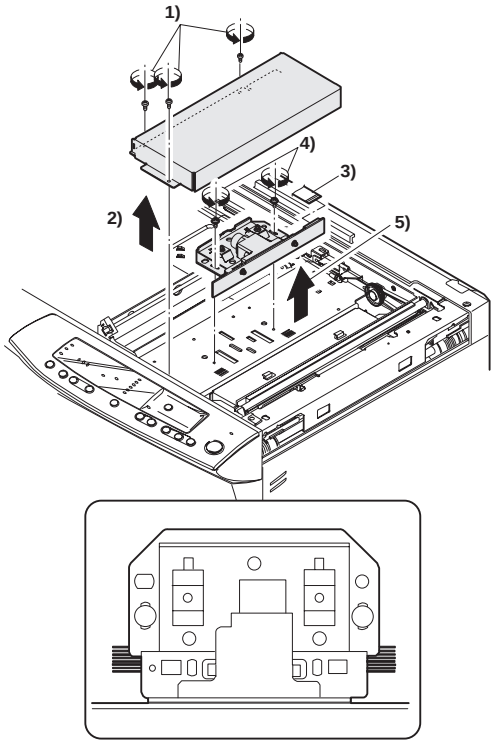


(3) Pull the copy lamp unit toward you to remove the harness.



(4) Remove the screw (4 pc) and remove the cover.

(5) Remove the screws (2 pcs.), the harness, and the optical unit.

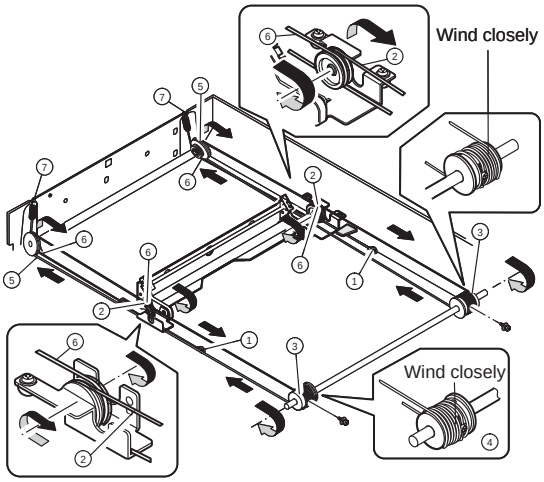


When installing the lens unit, refer to “8-6. Lens unit installation reference.”

C. Assembly procedure

Basically reverse the disassembly procedure.
The mirror base drive wire and the lens drive wire stretching methods are described below.

a. Mirror base drive wire stretching
   1. Hook the metal fixture of the mirror base drive wire on the projection of the optical base plate.
   2. Pass the wire through the external groove of the double pulley. (At that time, check that No. 2/3 mirror unit is in contact with the mirror base positioning plate.)
   3. Hold so that the winding pulley groove is up, and wind the mirror base drive wire 9 turns.
   4. Put the 8th turn of the mirror base drive wire in the winding pulley groove and fix with a screw.
   5. Pass the wire under No. 2/3 mirror unit plate and wind it around pulley A.
   6. Pass the wire through the internal groove of the double pulley, and pass through pulley B.
   7. Hook the spring hook on the optical base plate.



After installing the mirror base drive wire, be sure to perform main scanning direction image distortion adjustment.

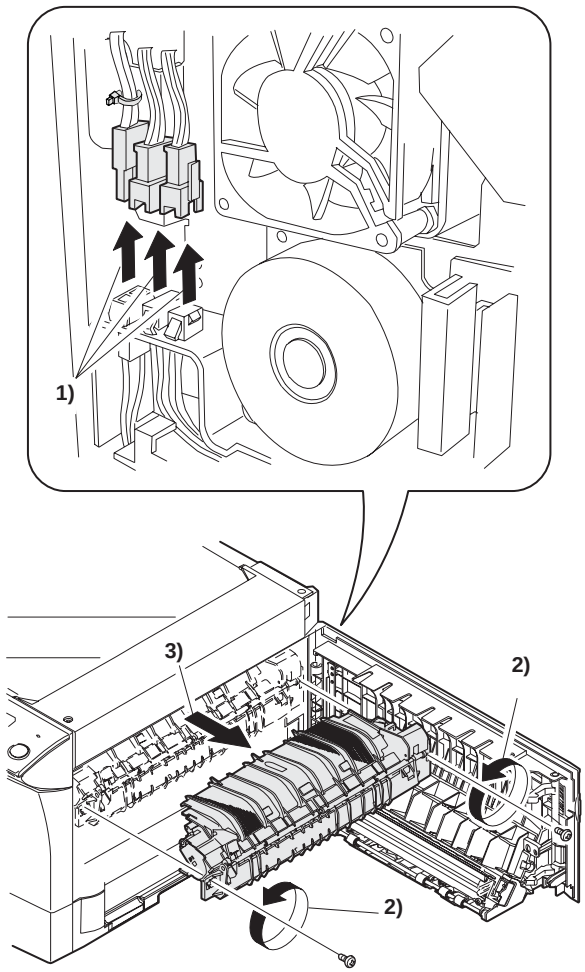
4. Fusing section

A. List

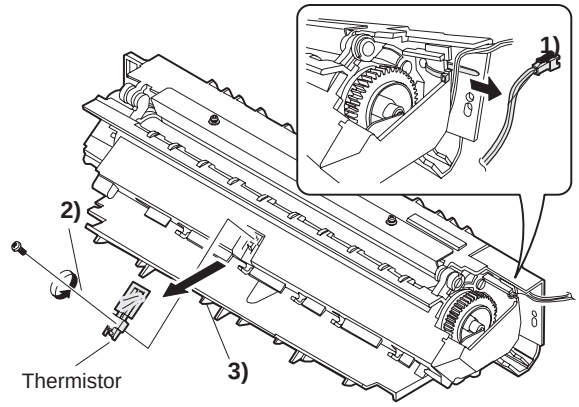
No.	Part name Ref.
1	Thermistor
2	PPD2 sensor
3	Heater lamp
4	Pressure roller
5	Heat roller

B. Disassembly procedure

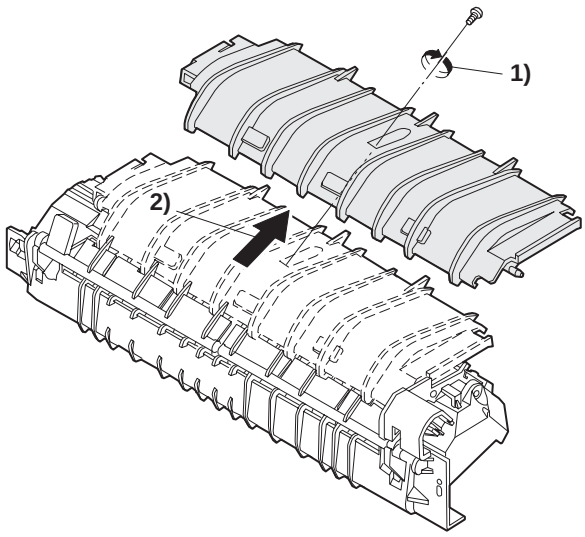
(1) Remove the connectors (3 pcs.) of the rear cabinet.
(2) Open the side cover, remove two screws, and remove the fusing unit.



(3) Cut the binding band, remove the screw, and remove the thermistor.

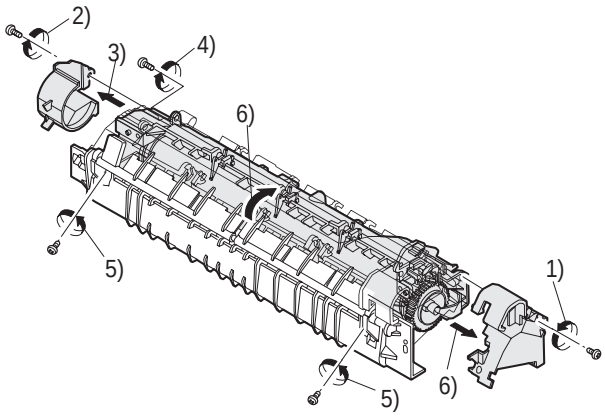


(4) Remove the screw and remove the U-turn guide.

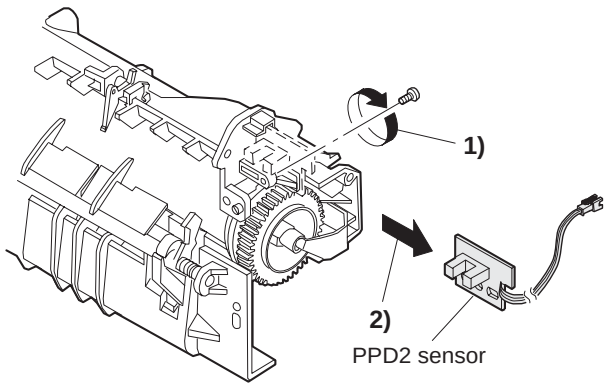


Pressure roller section disassembly

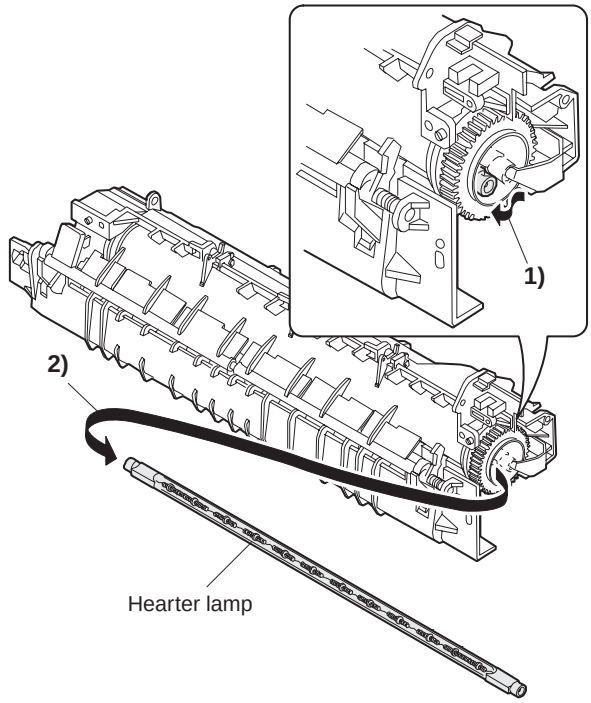
(5) Remove the three screws, remove the fusing cover lower on the right side, and open the heat roller section.



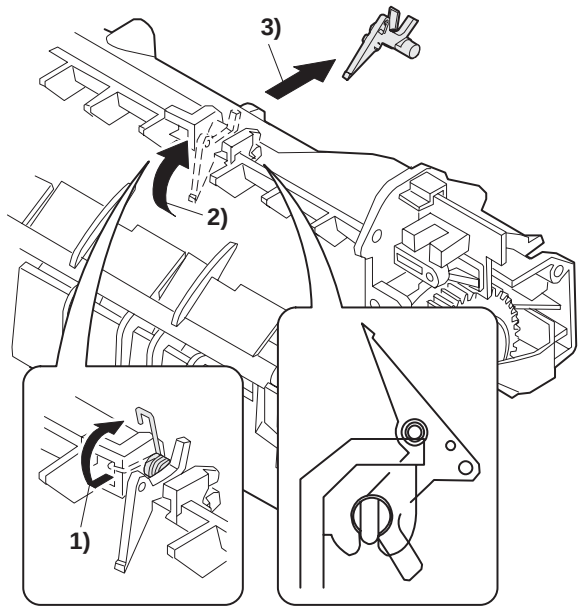
(6) Remove the screw and remove the PPD2 sensor.



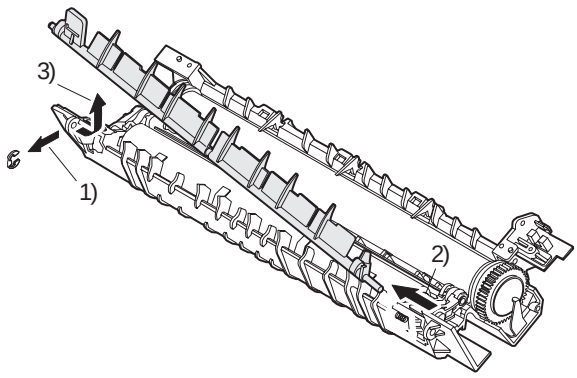
(7) Remove the plate spring on the right and remove the heater lamp.



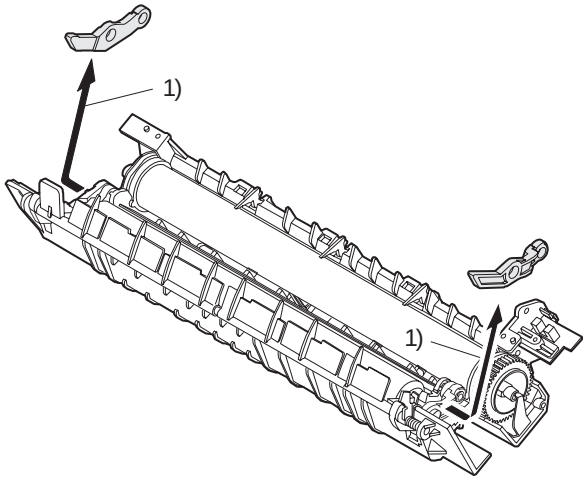
(8) Remove the spring and remove the separation pawls (3 pcs.).



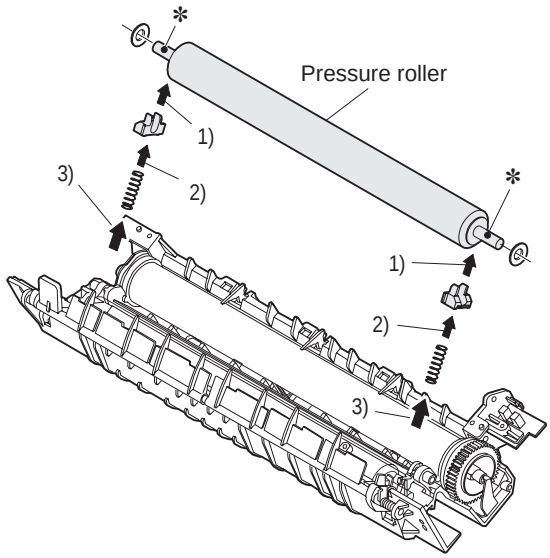
(9) Remove the E-ring and remove the reverse gate.



(10) Remove the pressure release levers on the right and the left sides.



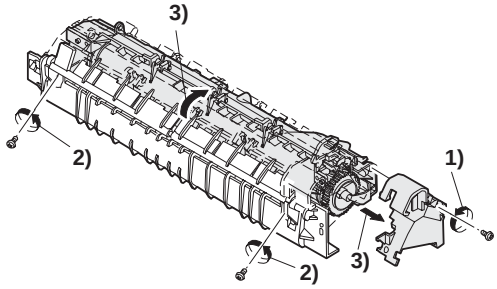
(11) Remove the pressure roller, the pressure bearing, and the spring.
Note: Apply grease to the sections specified with ✻.



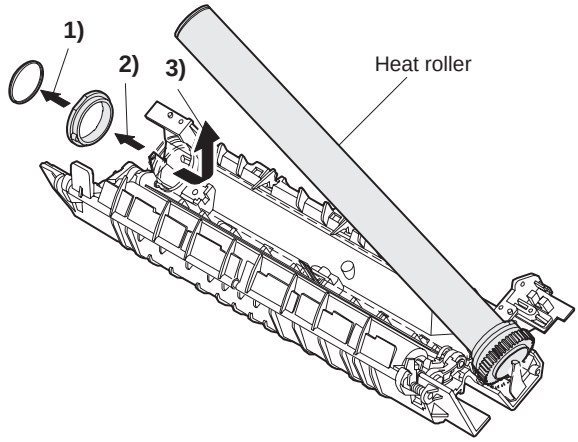
Heat roller disassembly

(Continued from procedure (4).)

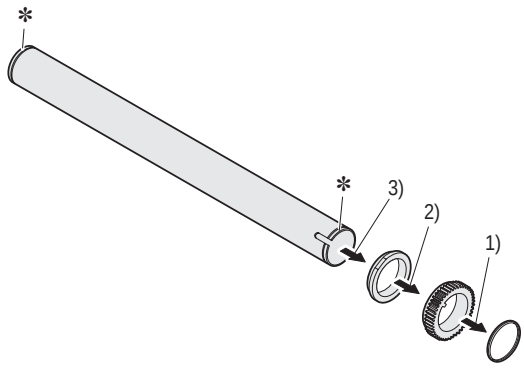
(5) Remove screws, remove the fusing cover, and open the heat roller section.



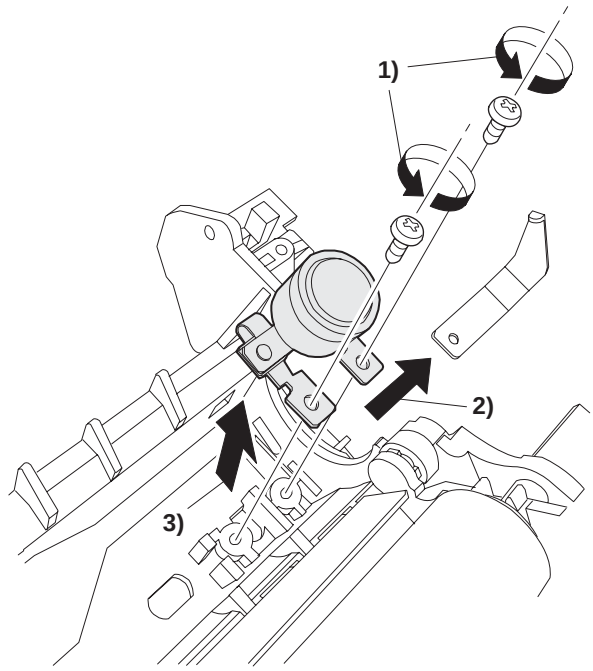
(6) Remove the C-ring and the fusing bearing, and remove the heat roller.



(7) Remove the parts from the heat roller.
Note: Apply grease to the sections specified with ✻.



(8) Remove two screws and remove the thermostat.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

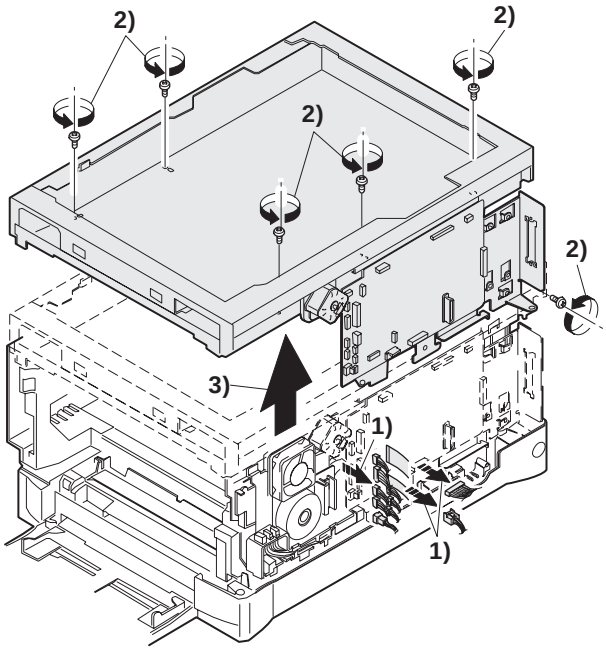
5. Tray paper feed/transport section

A. List

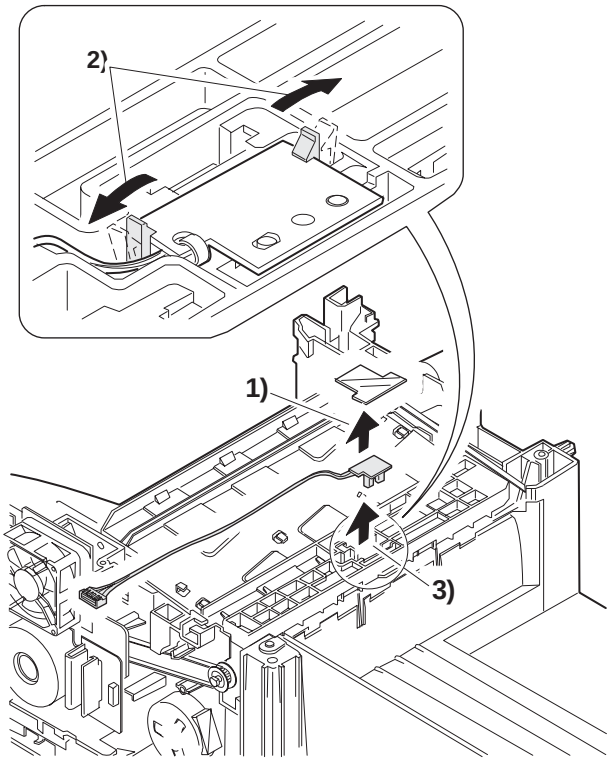
No.	Part name Ref.
1	PPD1 sensor PWB
2	LSU unit
3	Intermediate frame unit
4	Paper feed roller

B. Disassembly procedure

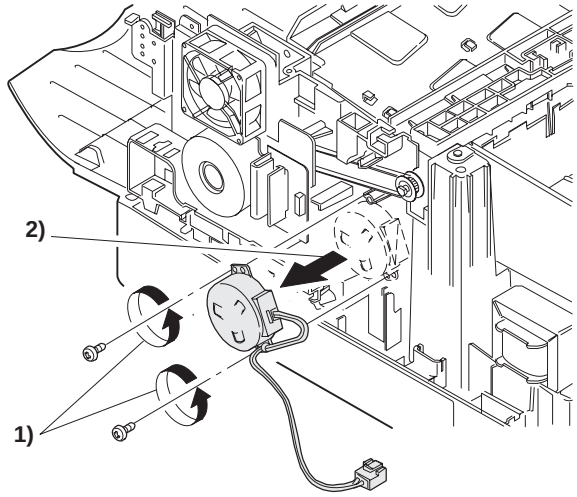
(1) Remove six connectors and screws of the main PWB, and lift the optical unit and the main PWB to remove.



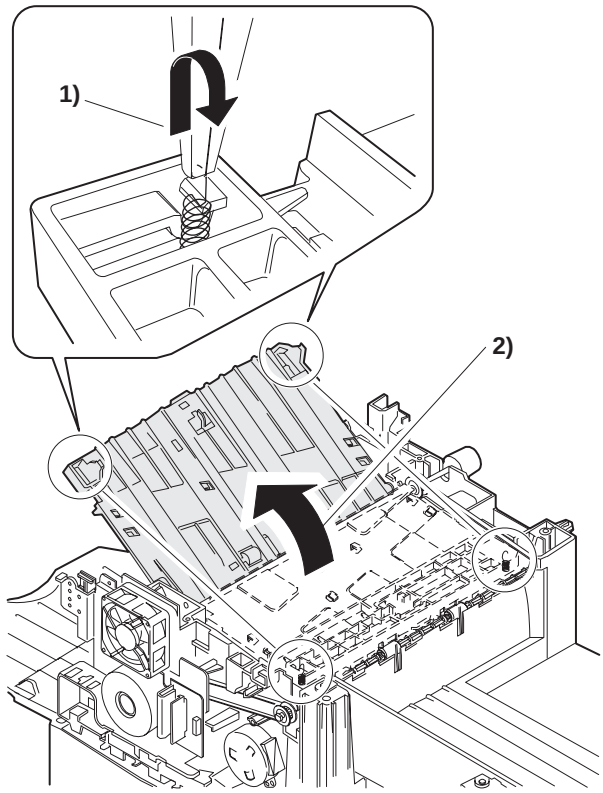
(2) Remove the PWB insulation mylar and remove the paper transport detection sensor (PPD2).



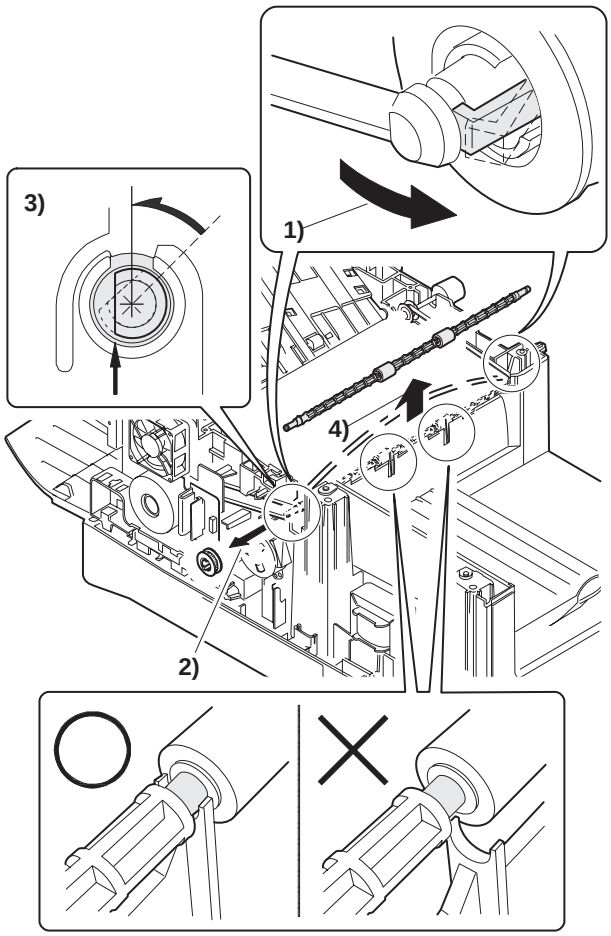
(3) Remove two screws and remove the toner motor.



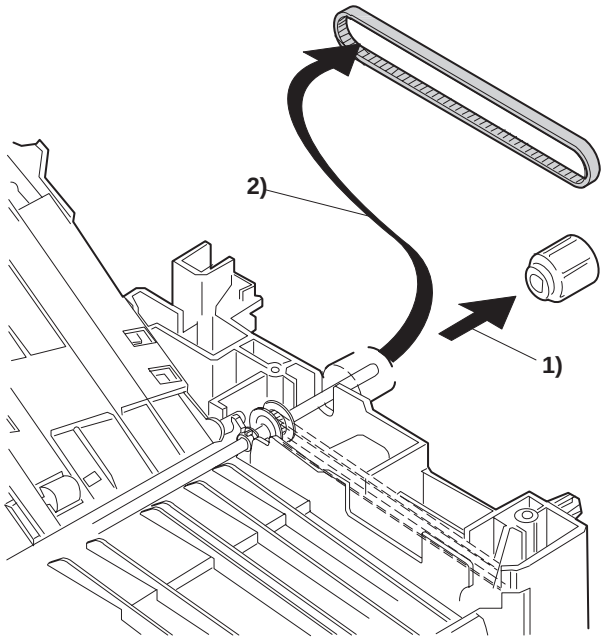
(4) Remove two springs and open the intermediate frame unit.



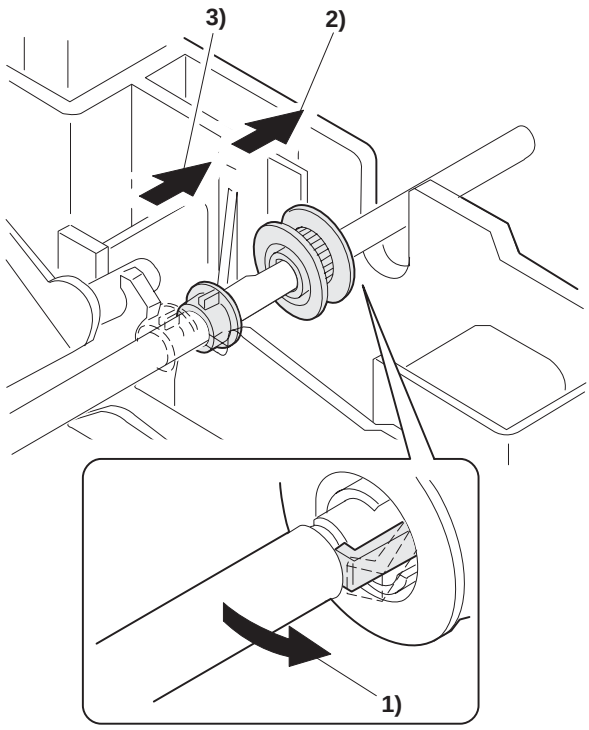
(5) Remove the pulleys on the both sides and remove the paper exit roller.



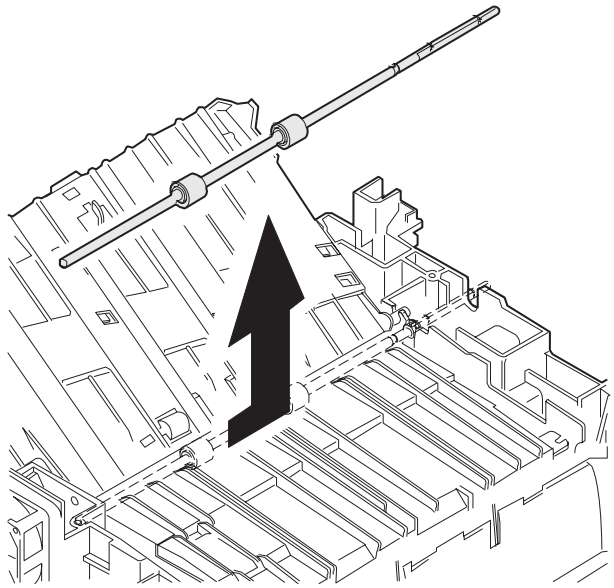
(6) Pull out the paper exit roller knob and remove the belt.



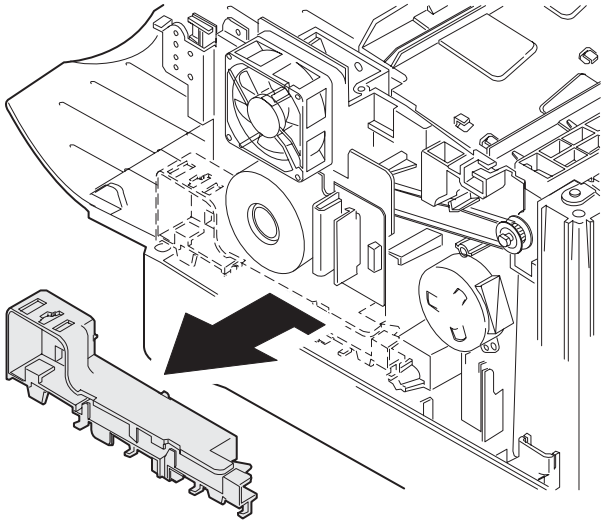
(7) Release the belt pulley lock and remove the belt pulley bearing.



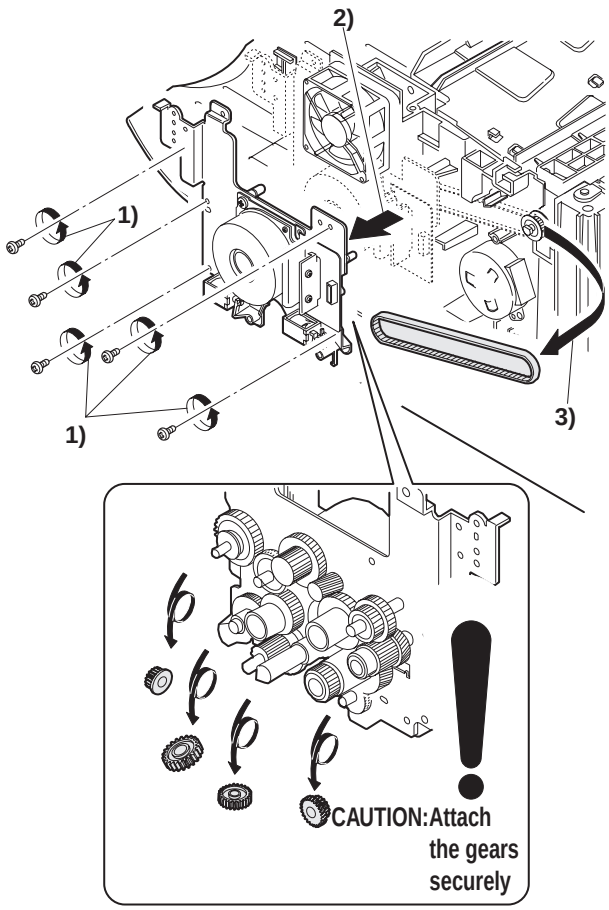
(8) Remove the paper exit roller.



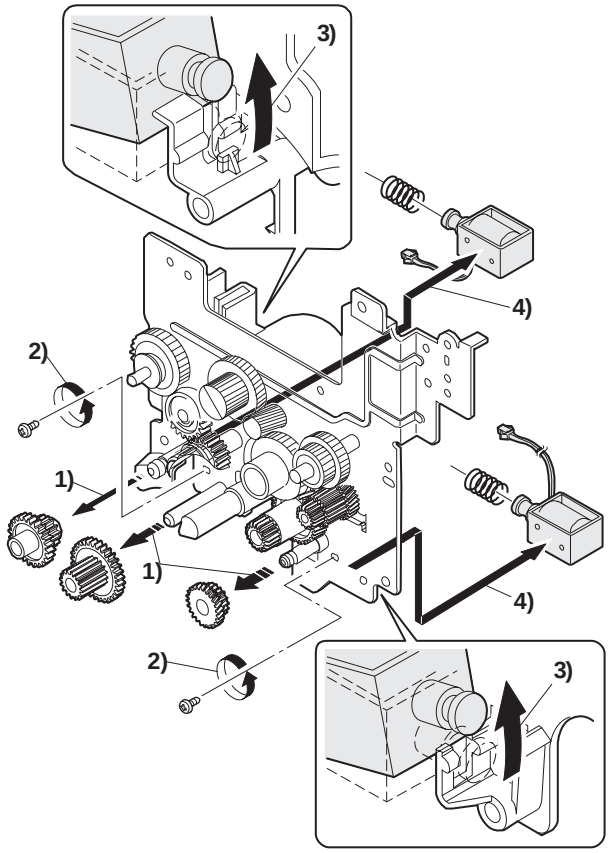
(9) Remove the harness guide.



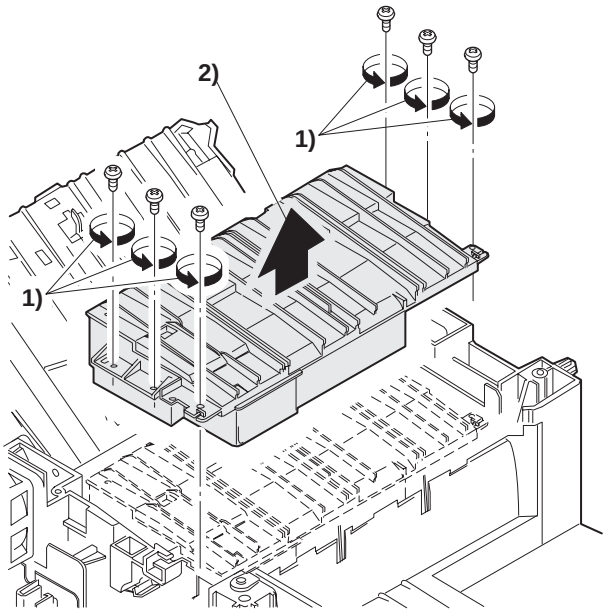
(10) Remove five screws and remove the main drive plate and the belt.



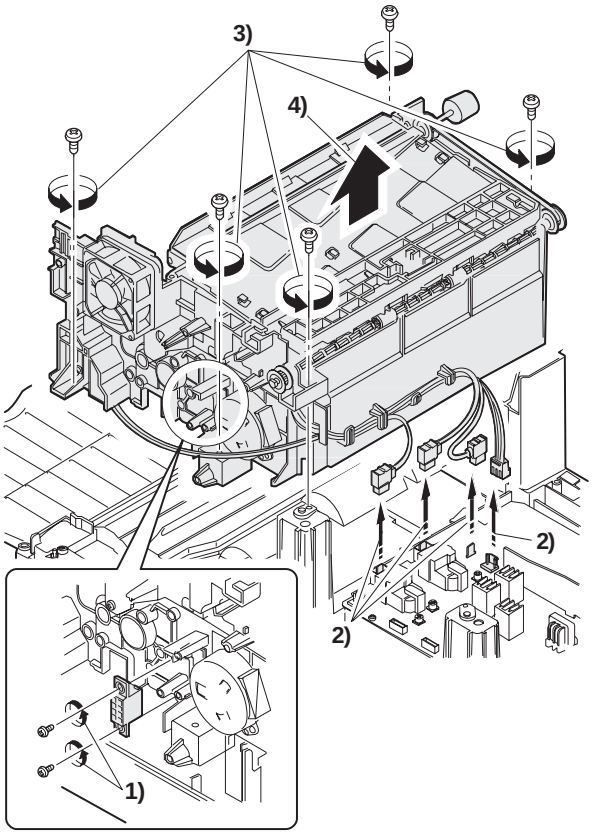
(11) Remove the parts as shown below, and remove the pressure release solenoid and the paper feed solenoid.



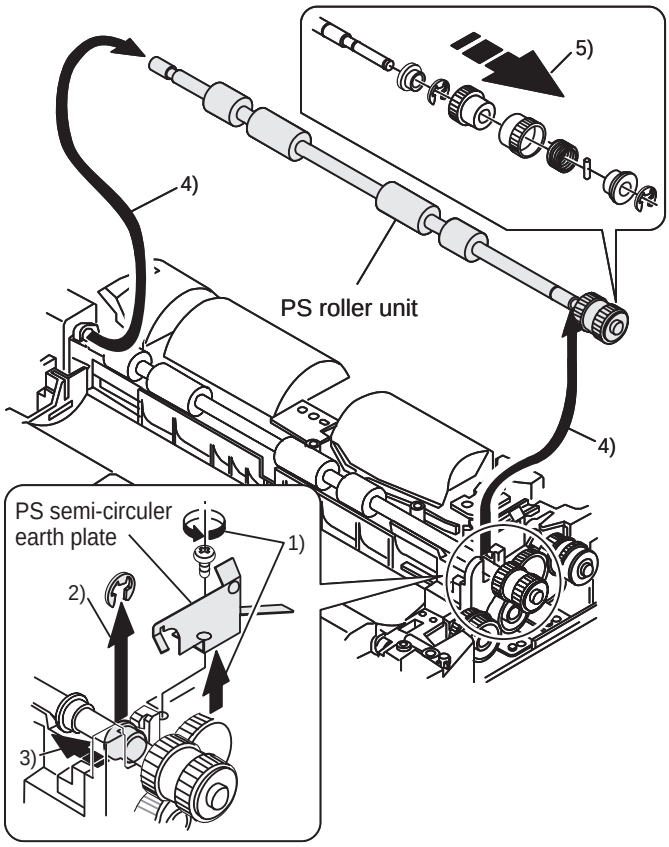
(12) Remove six screws and remove the LSU unit.



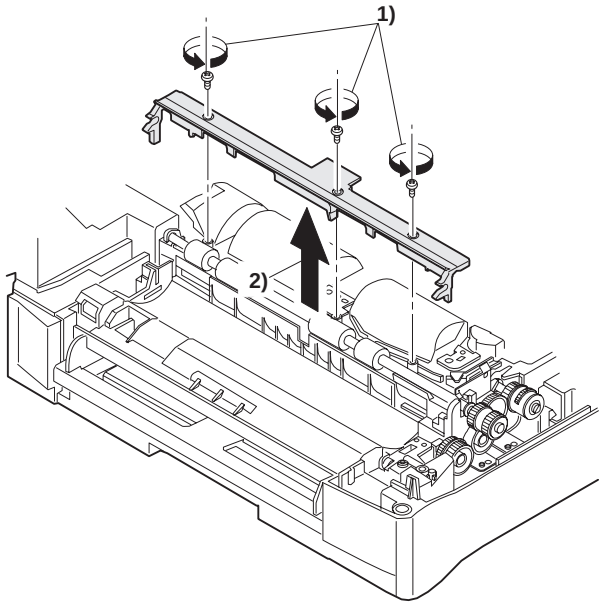
(13) Remove two screws and remove the fusing connector.
(14) Remove five screws and the connector, and lift the intermediate frame unit to remove.



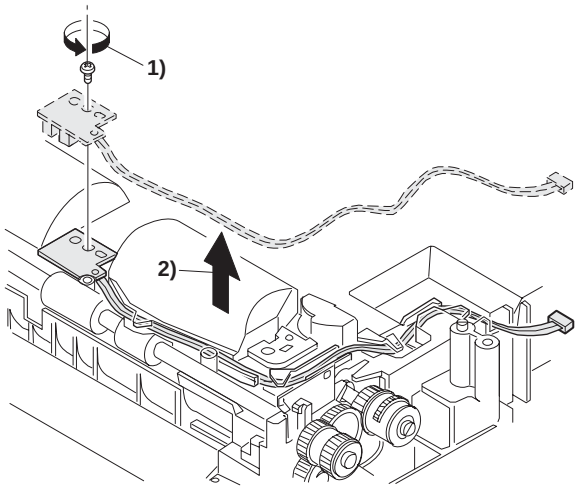
(15) Remove the screw and the E-ring, and remove the PS semi-circular earth plate and the PS roller unit.
(16) Remove the E-ring and remove the spring clutch from the PS roller unit.



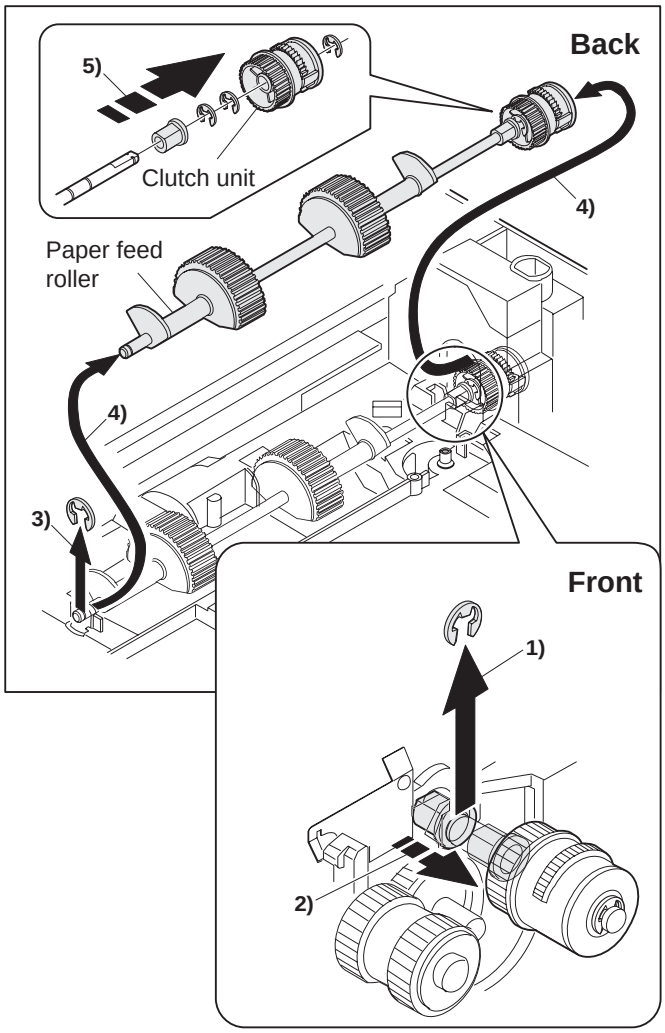
(17) Remove three screws and remove the TC front paper guide.



(18) Remove the screw and the connector, and remove the PPD1 sensor PWB.



(19) Remove two E-rings and remove the paper feed roller.
(20) Remove three E-rings and remove the clutch unit.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

6. Manual paper feed section

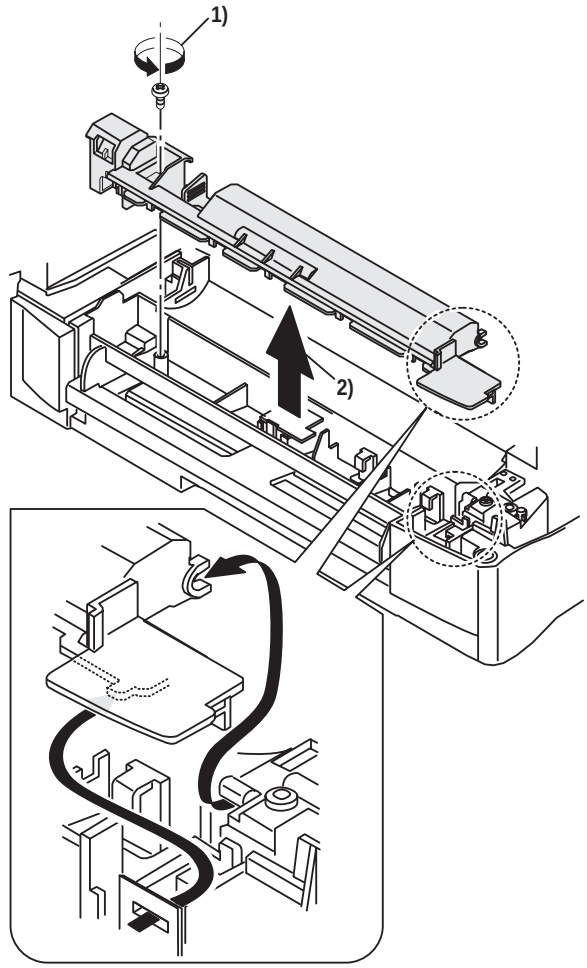
A. List

No.	Part name Ref.
1	Manual transport roller
2	Cassette detection switch
3	PPD1 sensor PWB
4	Side door detection unit

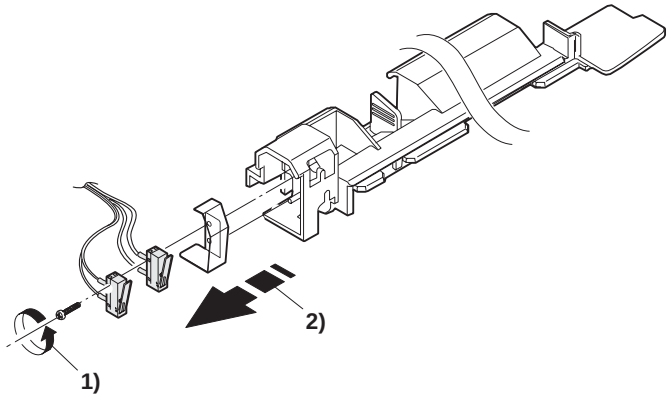
B. Disassembly procedure

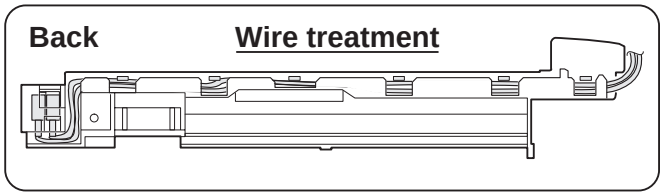
Single unit

(1) Remove the screw and remove the single upper cover.

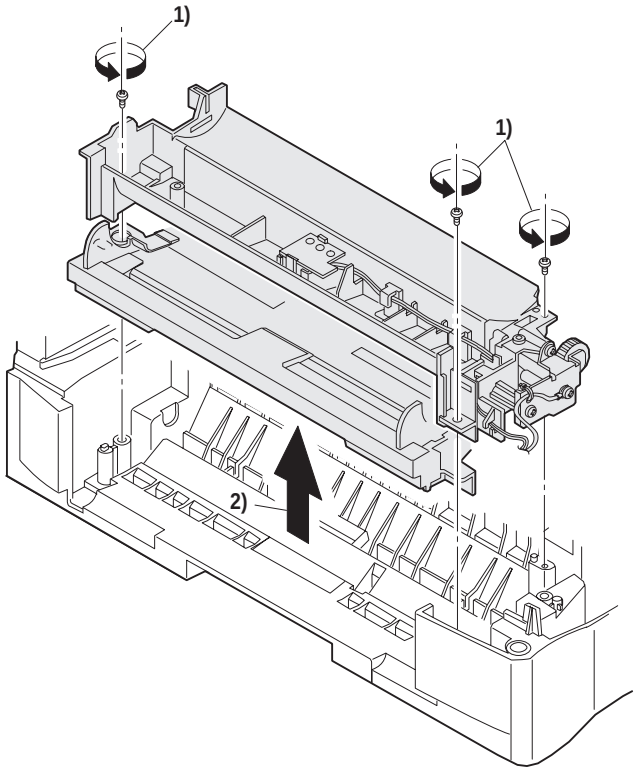


(2) Remove the screw and remove the side door detection unit.

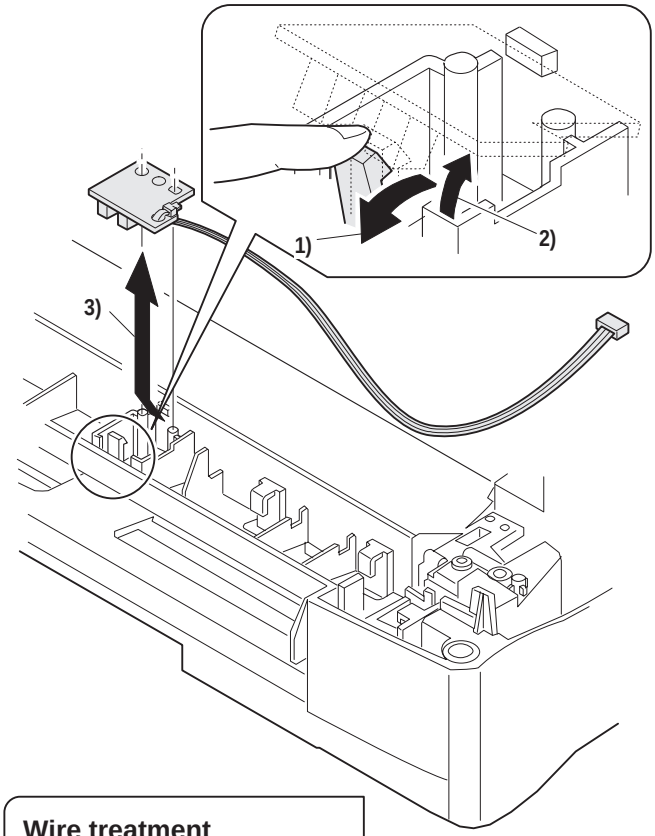


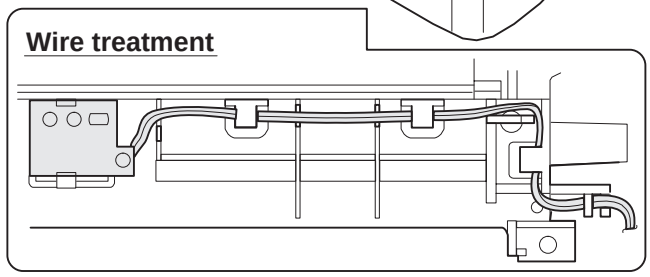


(3) Remove three screws and remove the single manual feed upper frame.

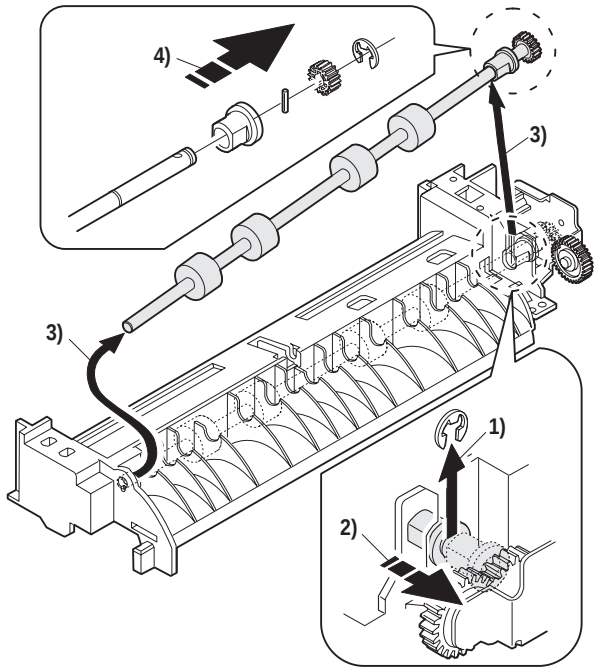


(4) Remove the PPD1 sensor PWB.

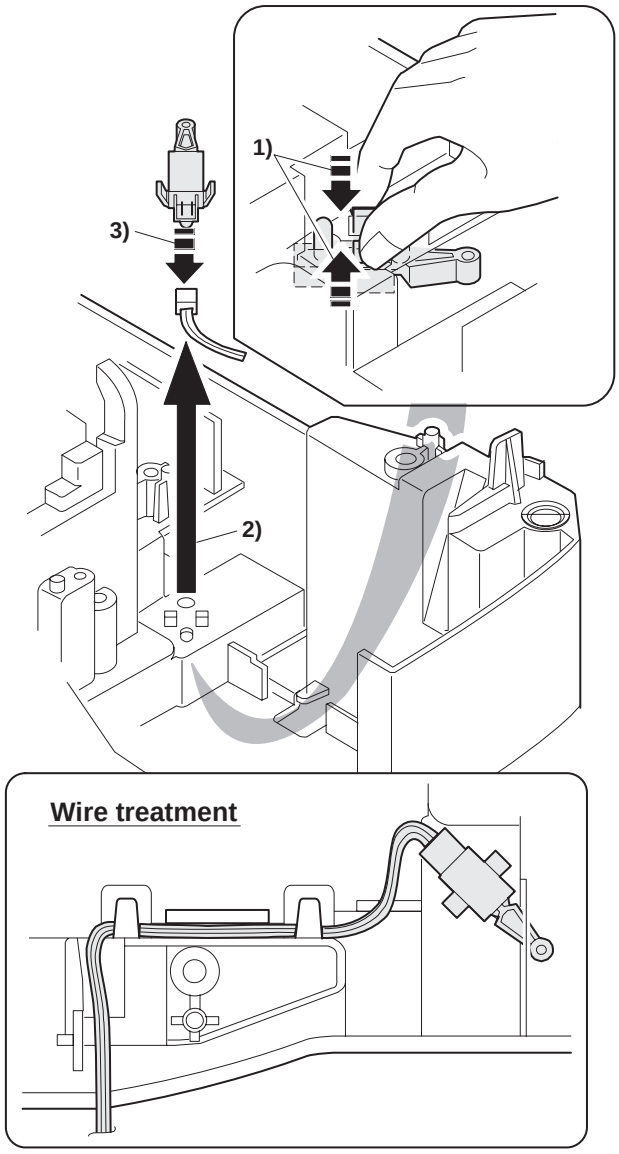




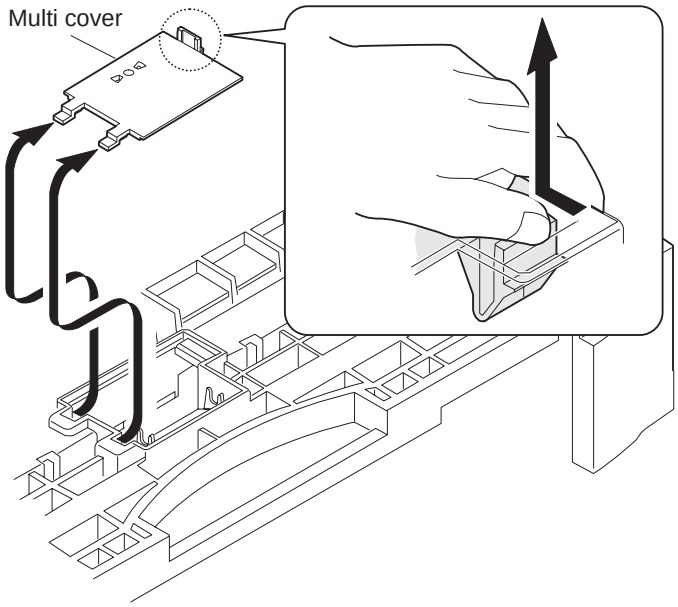
(5) Remove the E-ring and remove the manual paper feed transport roller.



(6) Remove the cassette detection switch.

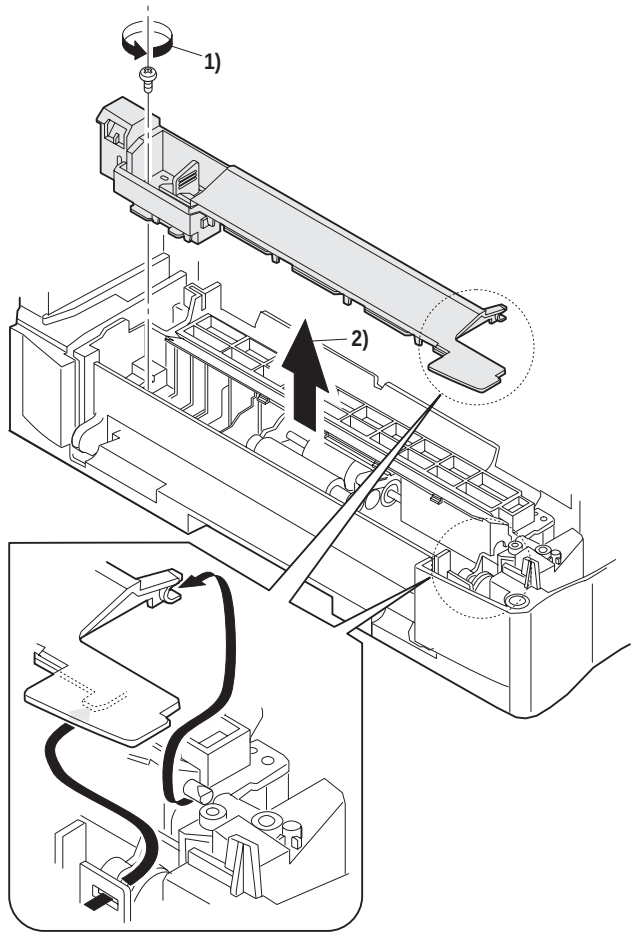


(7) Remove the multi cover.

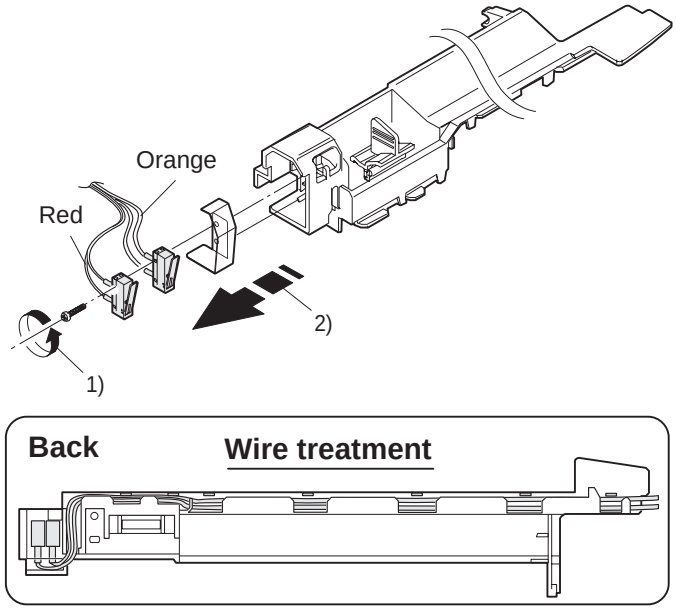


Multi unit

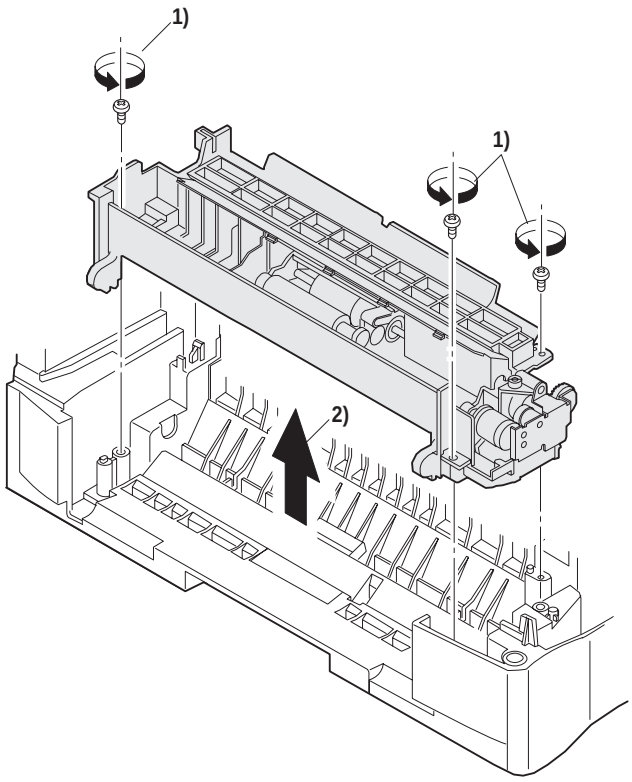
(1) Remove the screw and remove the multi upper cover.



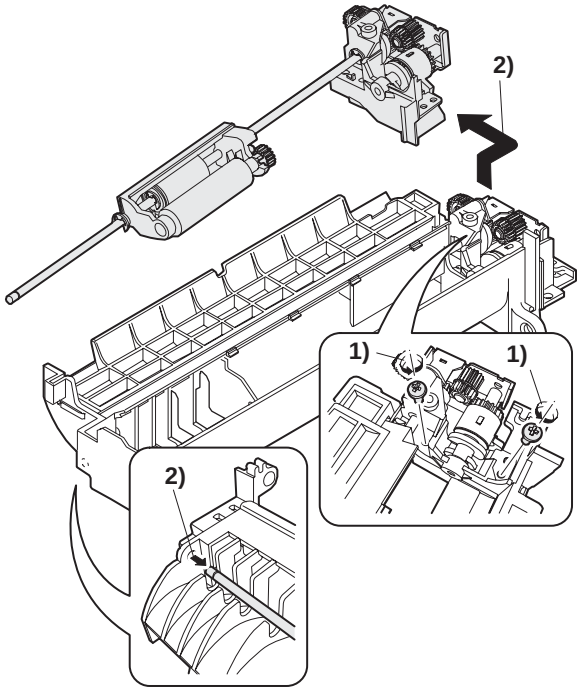
(2) Remove the screw and remove the side door detection unit.



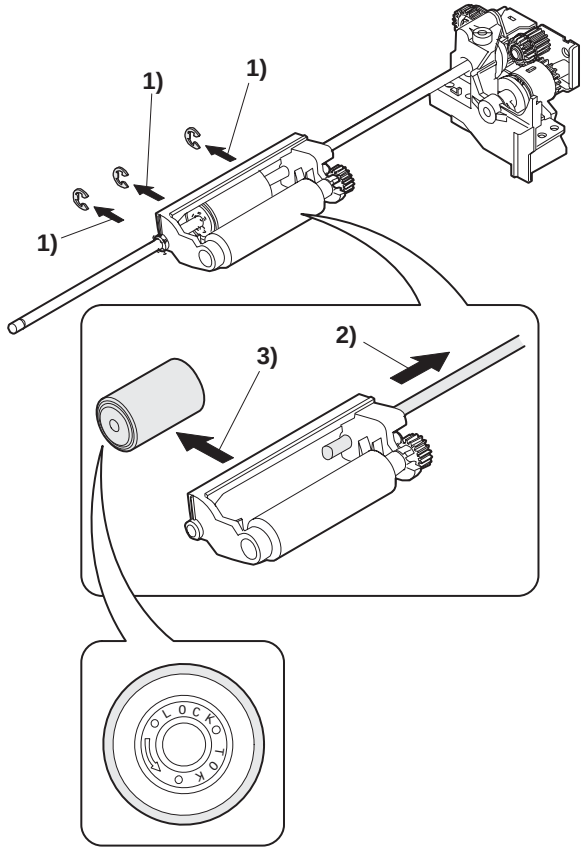
(3) Remove three screws and remove the multi paper feed upper frame.



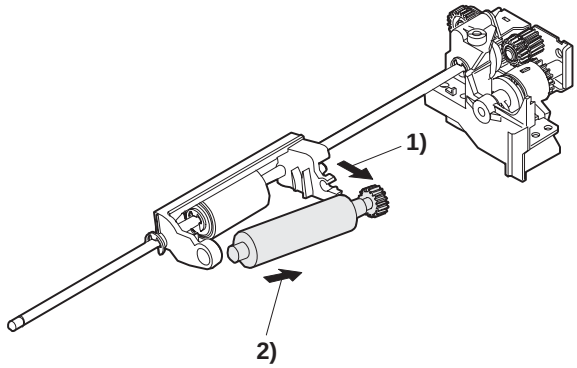
(4) Remove two screws and remove the multi feed bracket unit from the multi paper feed upper frame.



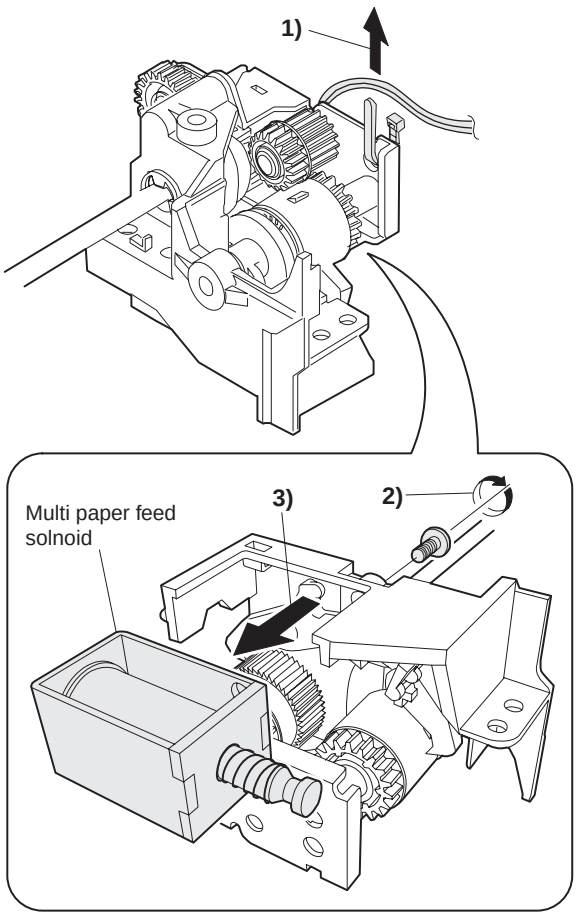
(5) Remove three E-rings and remove the manual paper feed roller.



(6) Remove the pick-up roller.



(7) Cut the binding band and remove the multi paper feed solenoid.

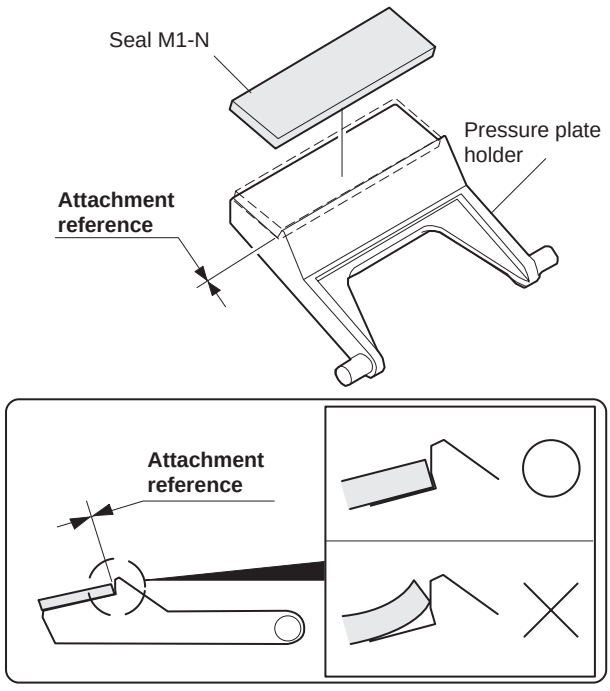


C. Assembly procedure

For assembly, reverse the disassembly procedure.

D. Pressure plate holder attachment

(1) Attach the pressure plate holder so that the resin section is not covered with the seal M1-N.



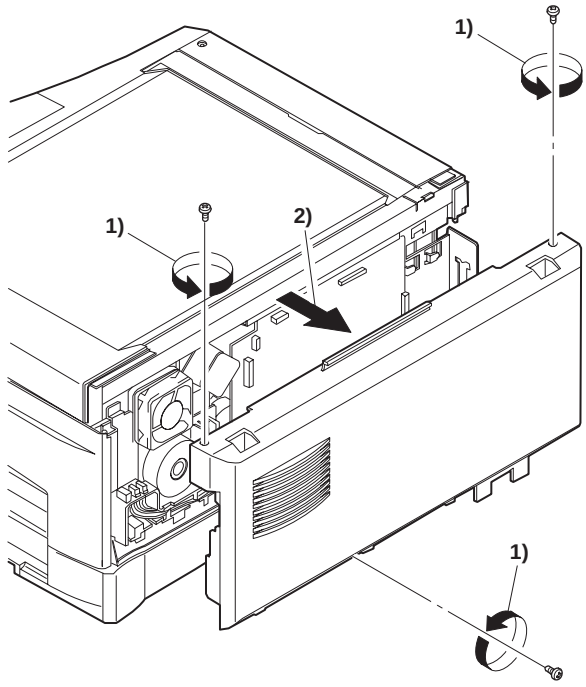
7. Rear frame section

A. List

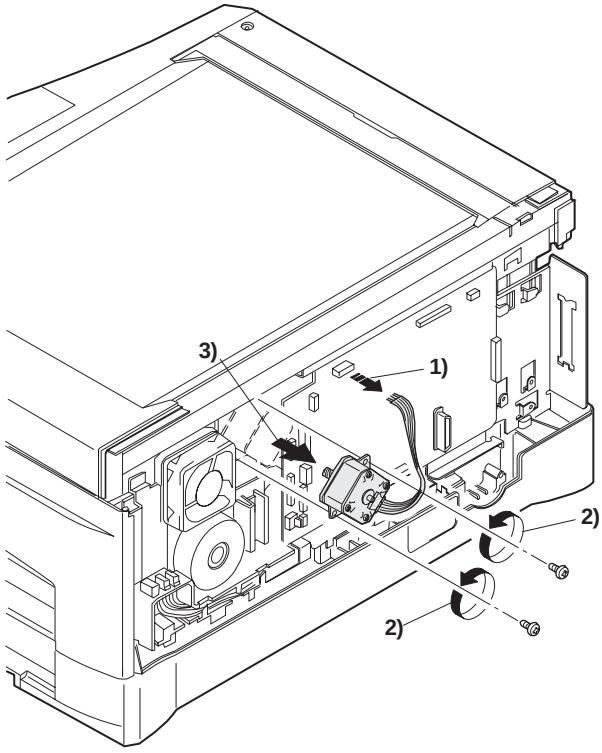
No.	Part name Ref.
1	Mirror motor
2	Main motor
3	Exhaust fan motor

B. Disassembly procedure

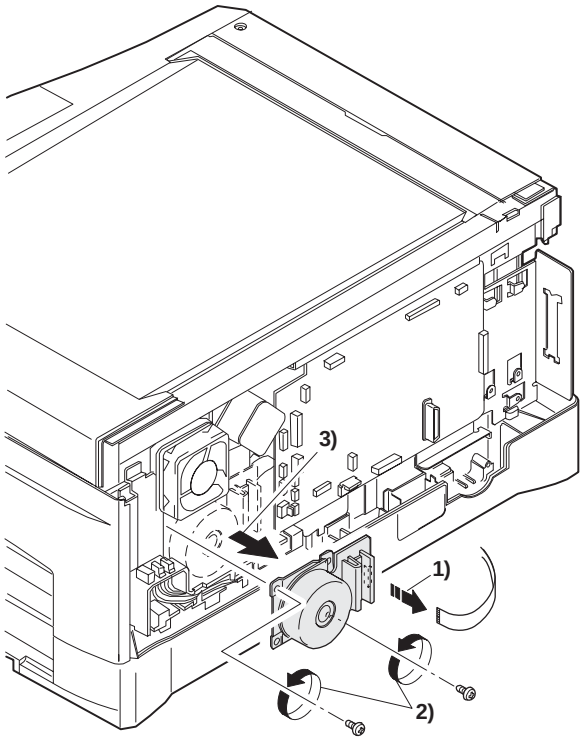
(1) Remove three screws and remove the rear cabinet.



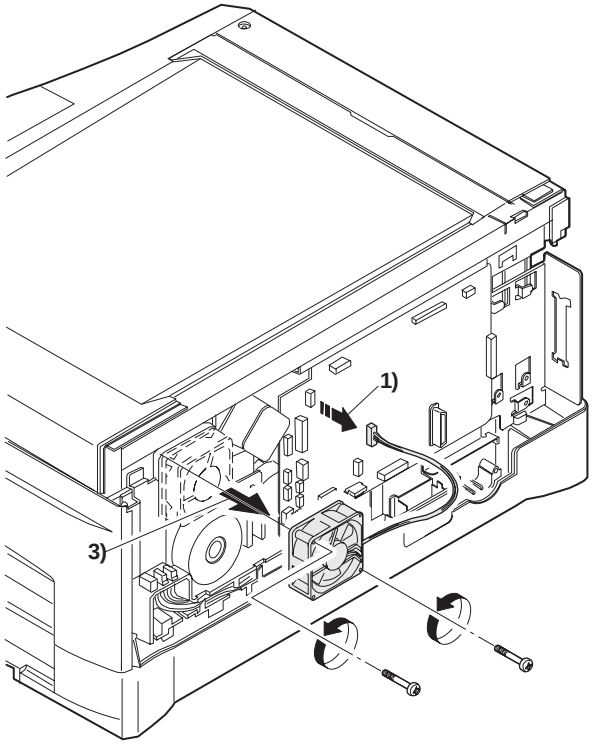
(2) Remove two screws, the harness, and the mirror motor.



(3) Remove two screws and one harness, and remove the main motor.



(4) Remove two screws and one connector, and remove the exhaust fan motor.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

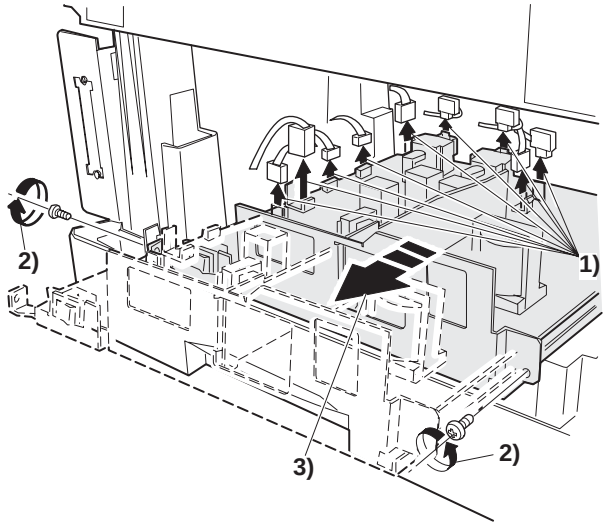
8. Power section

A. List

No.	Part name Ref.
1	Power PWB

B. Disassembly procedure

(1) Remove two screws and one connector, and remove the power PWB.



C. Assembly procedure

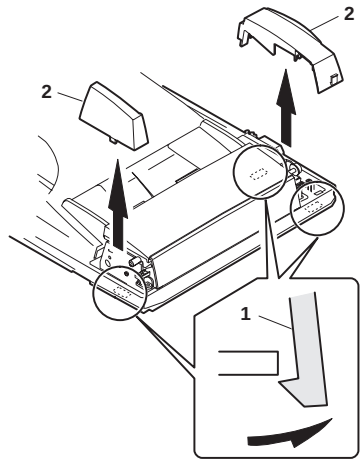
For assembly, reverse the disassembly procedure.

9. SPF section

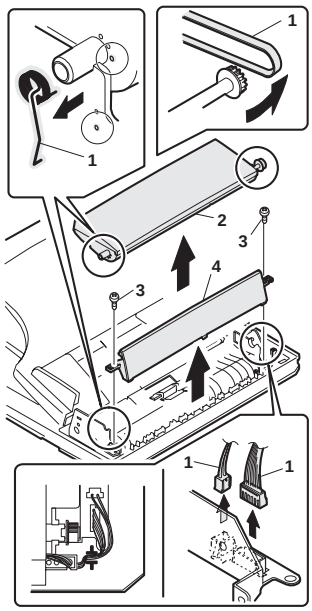
No.	Part name Ref.
A	Sensor PWB
B	Pickup solenoid
C	Clutch
D	Manual paper feed roller, pickup roller
E	Belt
F	SPF motor
G	Paper entry sensor
H	PS roller
I	Paper exit roller

Pickup unit removal

1) Remove three fixing pawls from the bottom of the machine.
2) Remove the front cover and the rear cover.



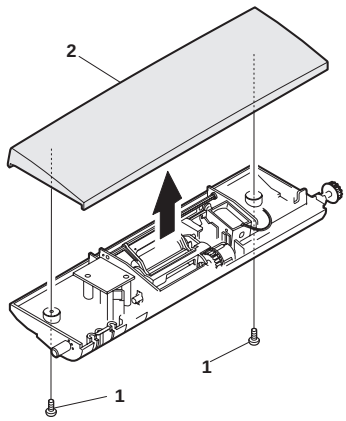
1) Remove the belt, the paper feed frame SP, and two harnesses.
2) Remove the pickup unit.



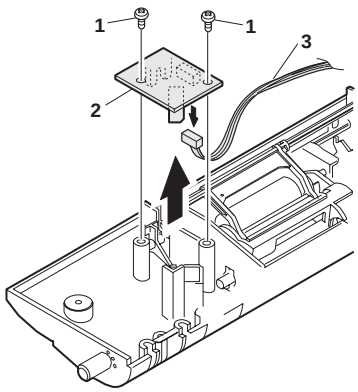
* When installing the parts, be careful of the hole position of the paper frame SP.

A. Sensor PWB

1) Remove two screws from the bottom of the pickup unit.
2) Remove the upper cover.

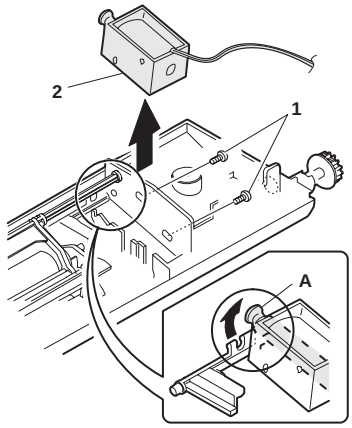


1) Remove two screws.
2) Remove the sensor PWB.
3) Remove the harness.



B. Pickup solenoid

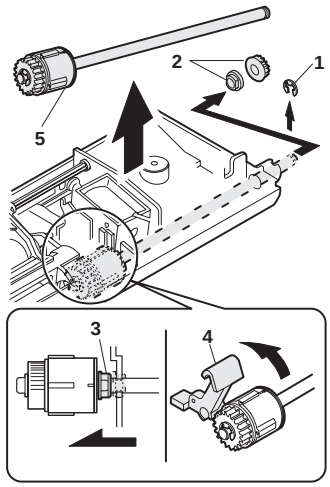
1) Remove two screws.
2) Remove the pickup solenoid



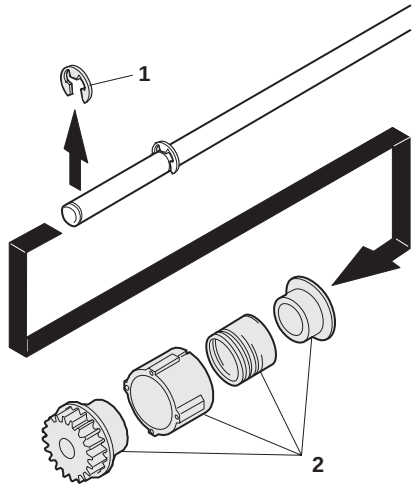
* When installing, hang iron core A on the solenoid arm.

C. Clutch

1) Remove the E-ring.
2) Remove the pulley and bushing.
3) Slide the bushing in the arrow direction.
4) Lift the clutch, and 5) remove the clutch.

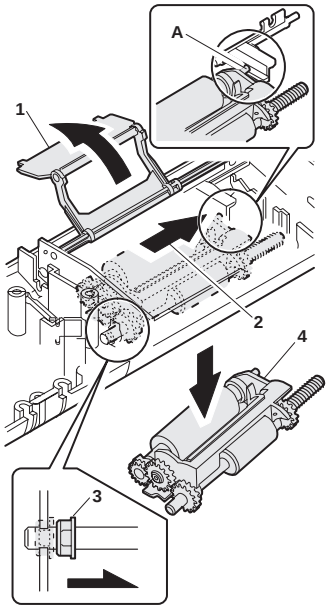


1) Remove the E-ring.
2) Remove the parts.



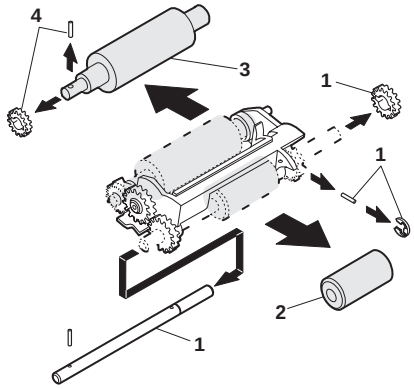
D. Manual paper feed roller, pickup roller

1) Lift the paper stopper.
2) Slide the takeup roller unit.
3) Slide the bushing in the arrow direction.
4) Remove the takeup roller unit.



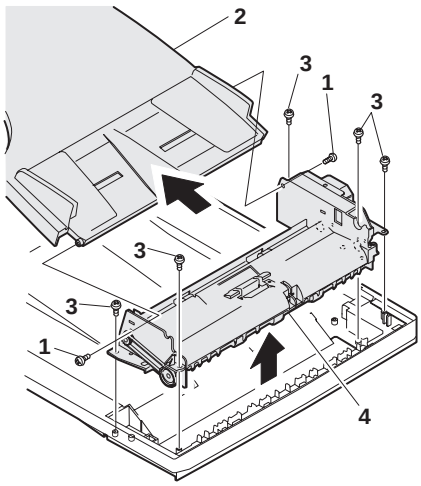
* When installing the takeup roller, hang the projection of the takeup roller unit on the solenoid arm.

1) Remove the parts.
2) Remove the manual paper feed roller.
3) Remove the pickup roller.
4) Remove the parts.



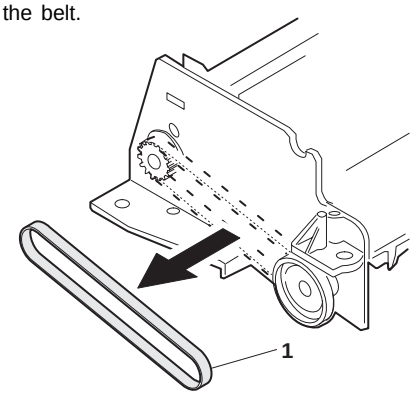
Transport unit removal

1) Remove two screws.
2) Remove the document tray unit.
3) Remove five screws.
4) Remove the transport unit.



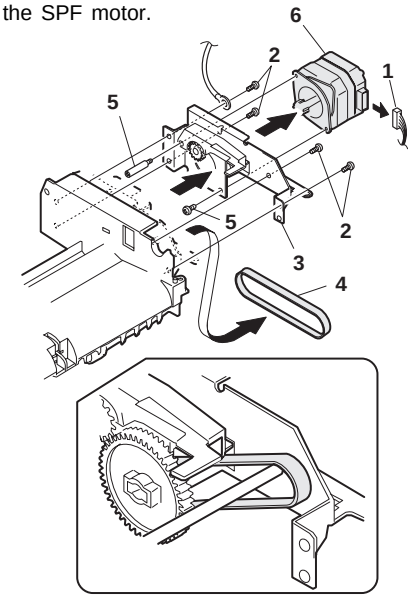
E. Belt

1) Remove the belt.



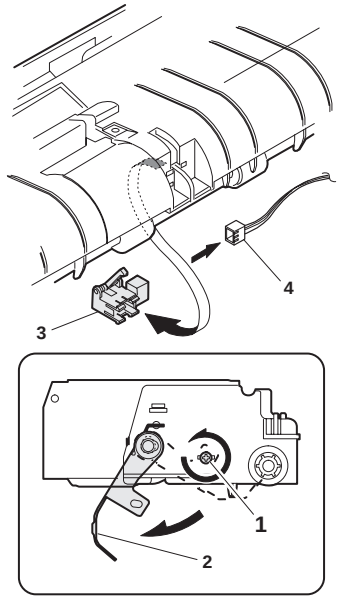
F. SPF motor

1) Remove the harness.
2) Remove four screws.
3) Remove the drive unit.
4) Remove the belt.
5) Remove two screws.
6) Remove the SPF motor.



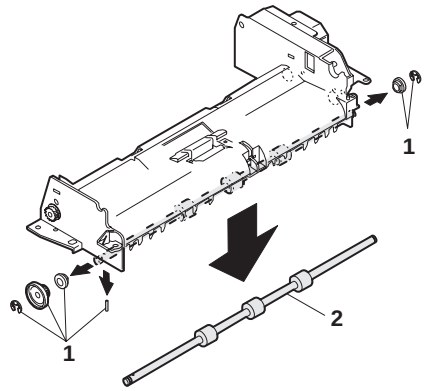
G. Paper entry sensor

1) Loosen the screw.
2) Open the paper exit PG.
3) Remove the paper entry sensor.
4) Remove the harness.



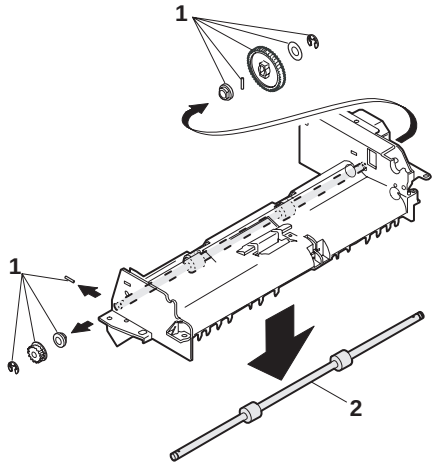
H. PS roller

1) Remove the parts.
2) Remove the PS roller.



I. Paper exit roller

1) Remove the parts.
2) Remove the paper exit roller.



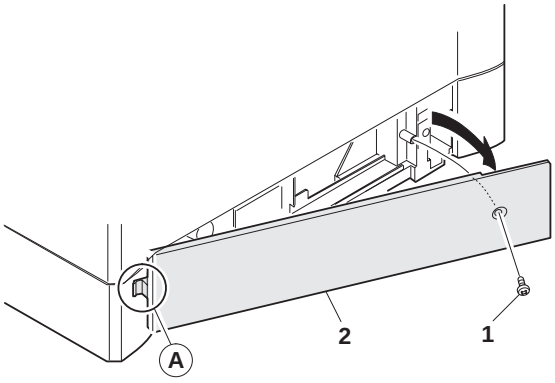
10. 2nd cassette section

No.	Part name Ref.
A	Paper sensor
B	Cassette detection SW
C	Paper feed solenoid
D	Transport roller
E	Paper feed clutch
F	2nd paper feed roller

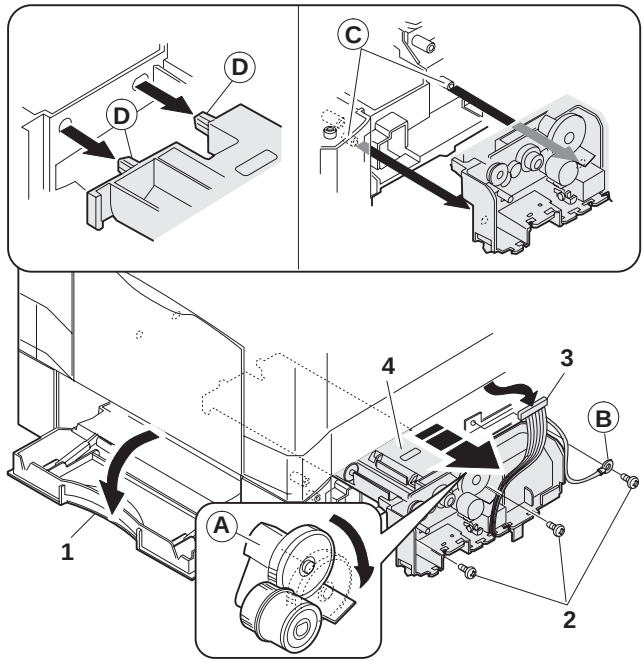
Paper feed unit removal

1) Remove the screw.
2) Remove the rear cover.

∗ When installing, engage the pawl and install the unit.



1) Open the right cabinet.
2) Remove three screws.
3) Remove one connector.
4) While tilting down the 2nd connection arm A, pull and remove the paper feed unit toward you.

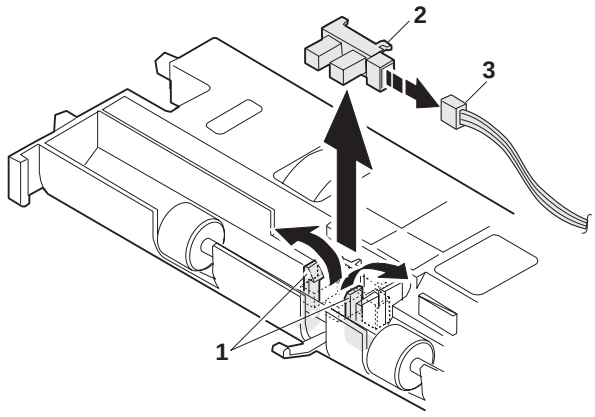


∗ When installing, securely insert two bosses C on the machine side and two bosses D on the paper feed unit side. Be sure to fix the earth B.

∗ Insert the 2nd page feed.

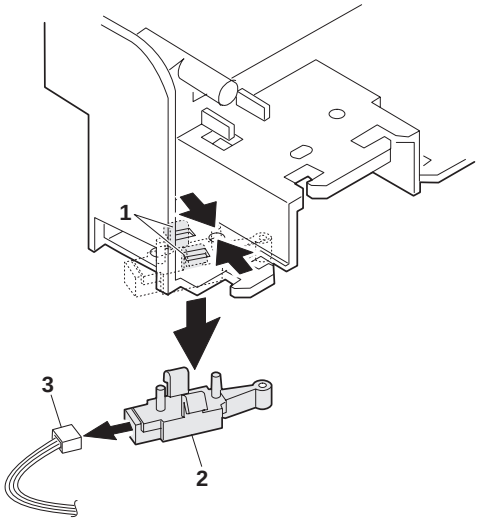
A. Paper sensor

1) Remove the pawl.
2) Remove the paper sensor.
3) Remove the harness.



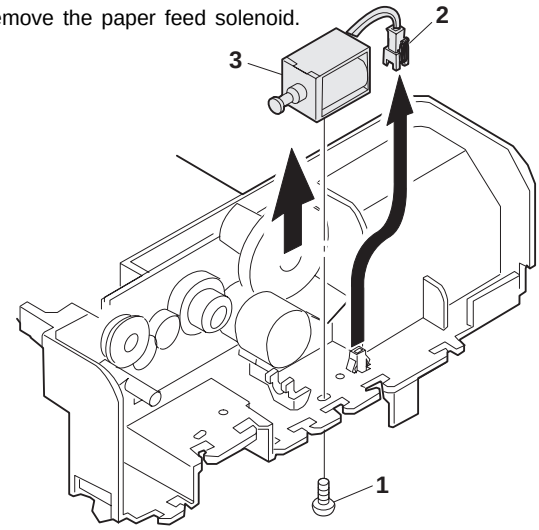
B. Cassette detection SW

1) Remove the pawl.
2) Remove the cassette detection SW.
3) Remove the harness.



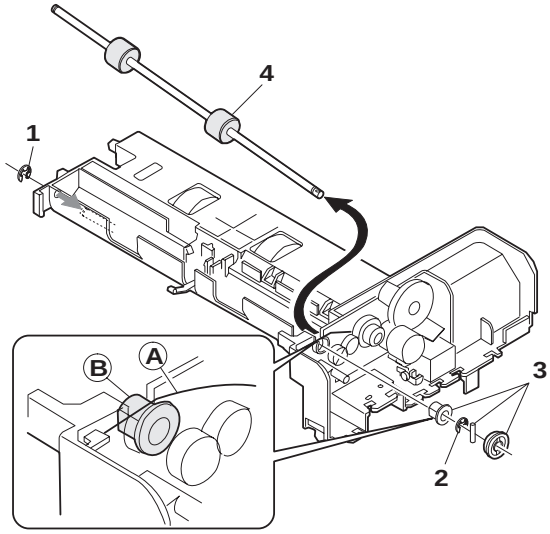
C. Paper feed solenoid

1) Remove the screw.
2) Remove the connector.
3) Remove the paper feed solenoid.



D. Transport roller

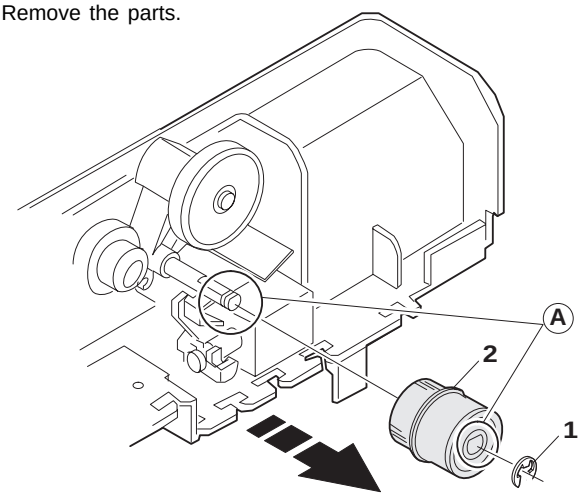
1) Remove two E-rings.
2) Remove the transport roller.

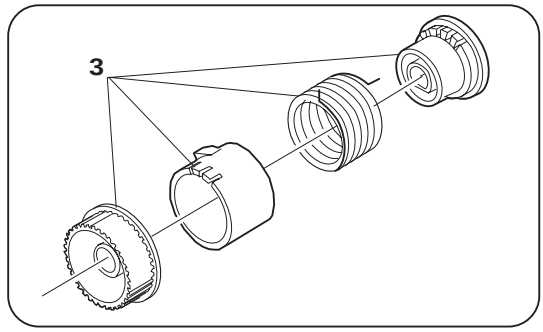


∗ Install so that the earth spring A is brought into contact over bearing B.

E. Paper feed clutch

1) Remove the E-ring.
2) Remove the paper feed clutch.
3) Remove the parts.

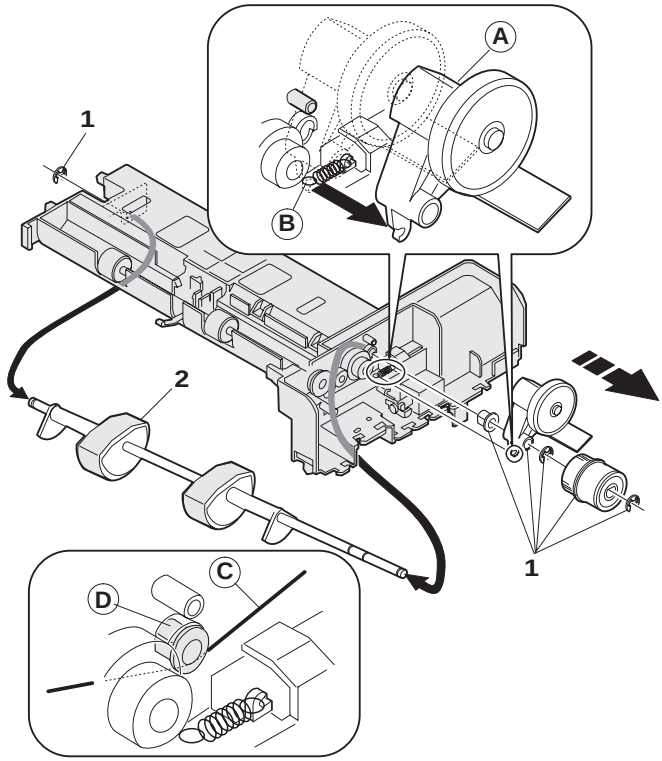




∗ When installing, fit the cut surface A.

F. 2nd paper feed roller

1) Remove the E-ring and the parts.
2) Remove the 2nd paper feed roller.

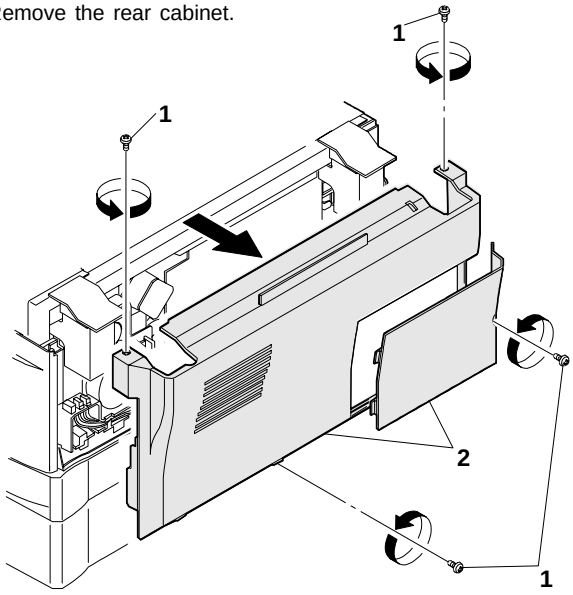


∗ When installing, hang the 2nd connection arm on the 2nd connection arm SP B. Be sure to install so that the earth spring C is in contact under the bearing D.

11. DUP motor section (AR-156 only)

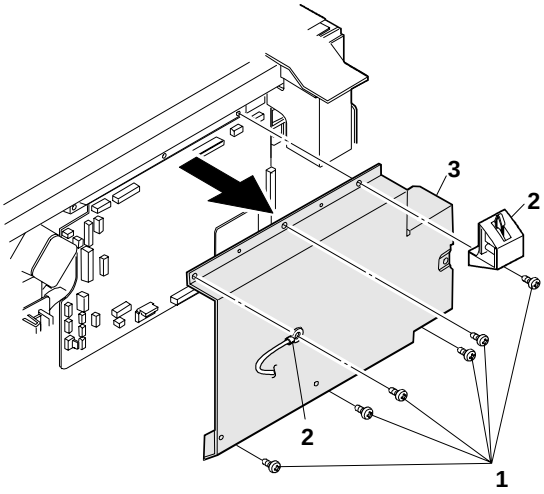
A. Remove the rear cabinet.

1) Remove four screws.
2) Remove the rear cabinet.



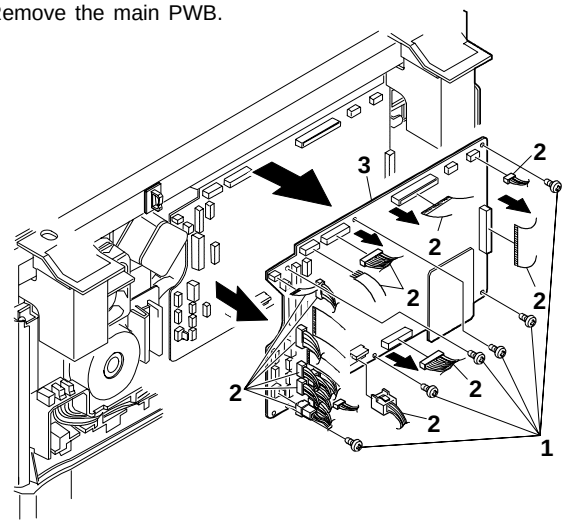
B. Remove the shield plate.

1) Remove six screws.
2) Remove the open/close detection unit, and the earth wire.
3) Remove the shield plate.



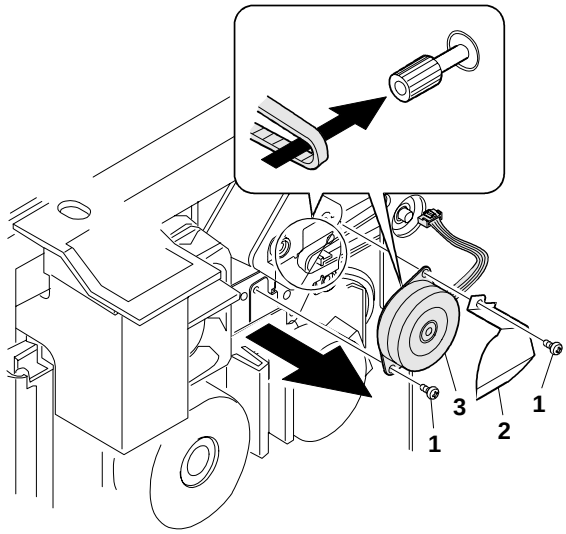
C. Remove the main PWB.

1) Remove six screws.
2) Remove connectors.
3) Remove the main PWB.



D. Remove the DUP motor.

1) Remove two screws.
2) Remove the DUP motor cover.
3) Remove the DUP motor.

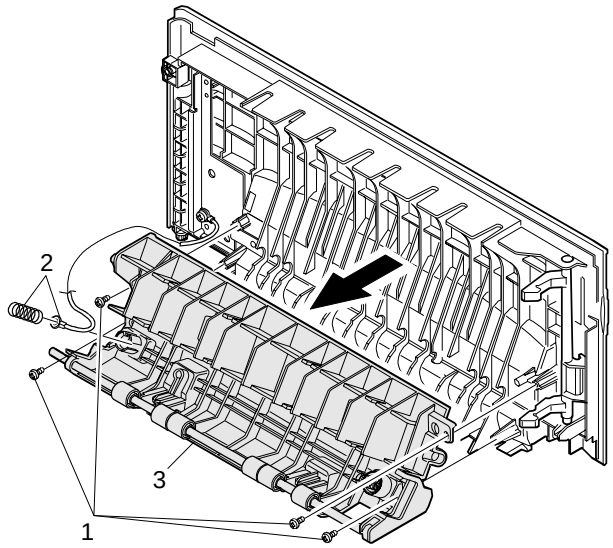


Note: When reassembling, be sure to engage the DUP motor gear with the belt on the main body side.

12. Reverse roller section (AR-156 only)

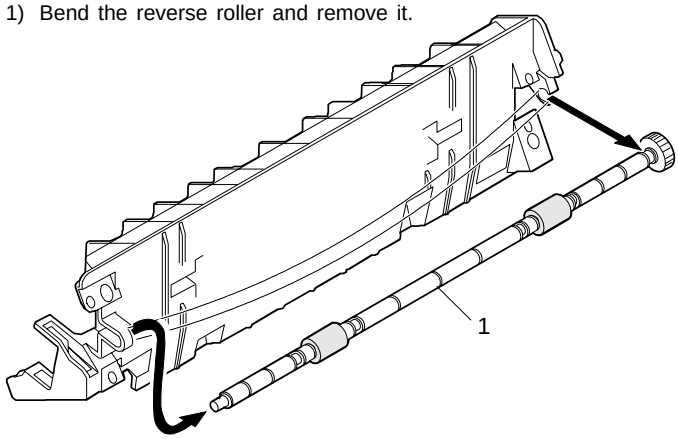
A. Remove the reverse unit.

1) Remove four screws
2) Remove the spring, and the earth wire
3) Remove the reverse unit.



B. Remove the reverse roller.

1) Bend the reverse roller and remove it.

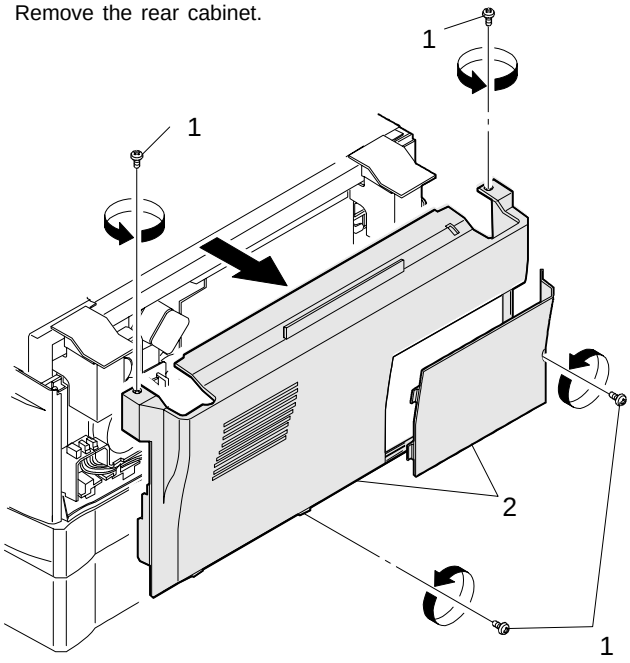


13. RSPF section (AR-156 only)

A. RSPF

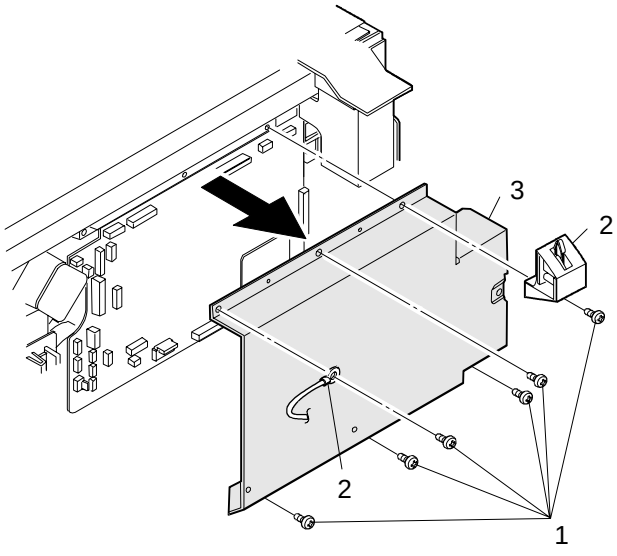
(1) Remove the rear cabinet.

1) Remove four screws.
2) Remove the rear cabinet.



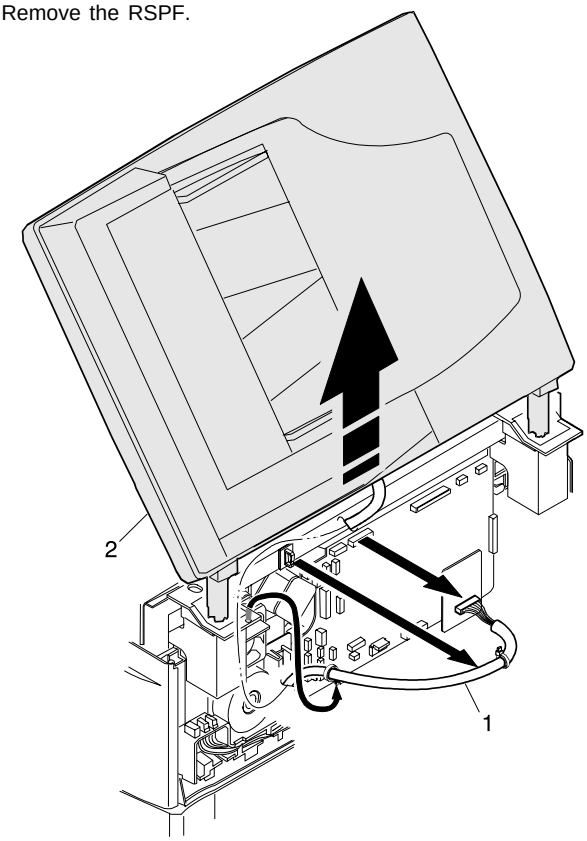
(2) Remove the shield plate.

1) Remove six screws.
2) Remove the open/close detection unit, and the earth wire.
3) Remove the shield plate.



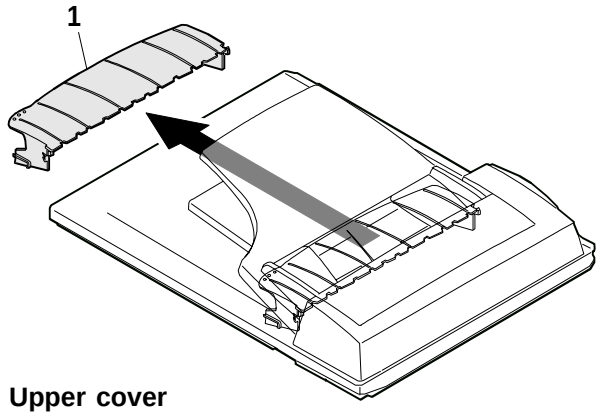
(3) Remove the RSPF.

1) Remove the connector and the cable.
2) Remove the RSPF.



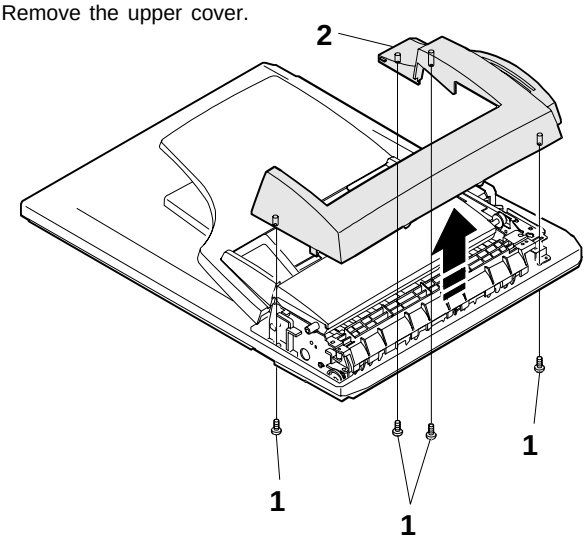
B. Intermediate tray

1) Remove the intermediate tray.



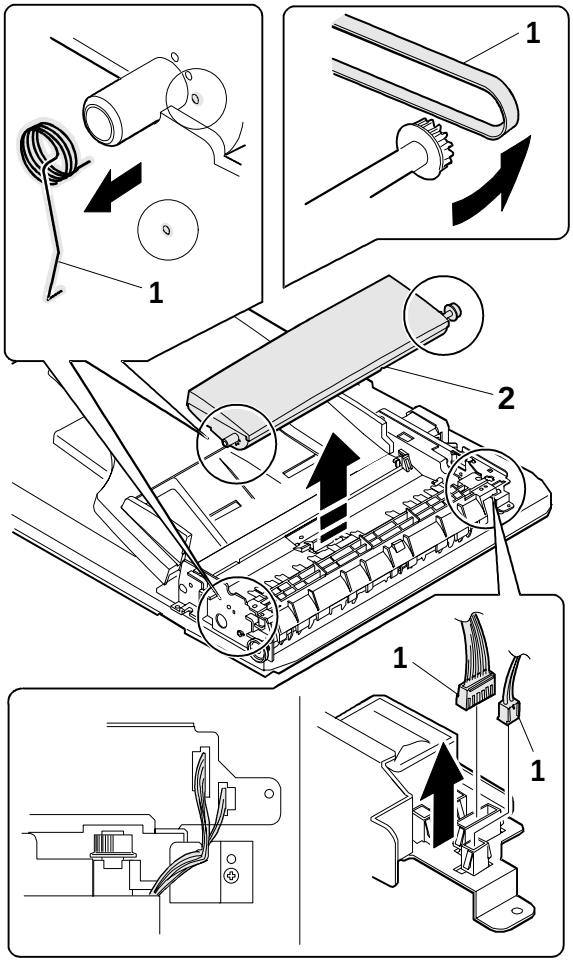
C. Upper cover

1) Remove four screws from the bottom of the main body.
2) Remove the upper cover.



D. Pickup unit

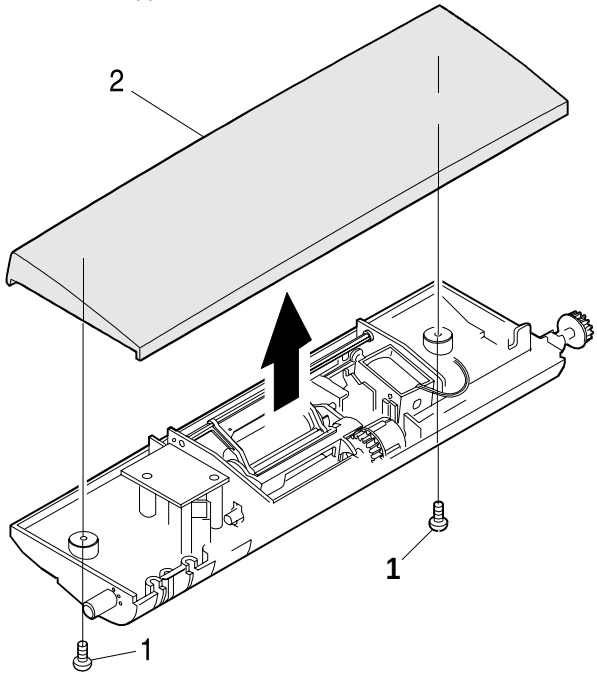
1) Remove the belt, the paper feed frame spring, and two harnesses.
2) Remove the pickup unit.



NOTE: When reassembling, be careful of the hole position for the paper feed frame spring.

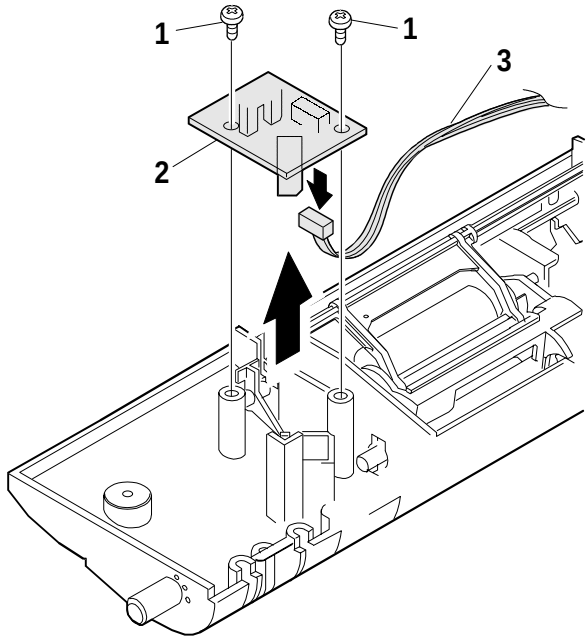
E. Upper cover of the pickup unit.

1) Remove two screws from the bottom of the pickup unit.
2) Remove the upper cover.



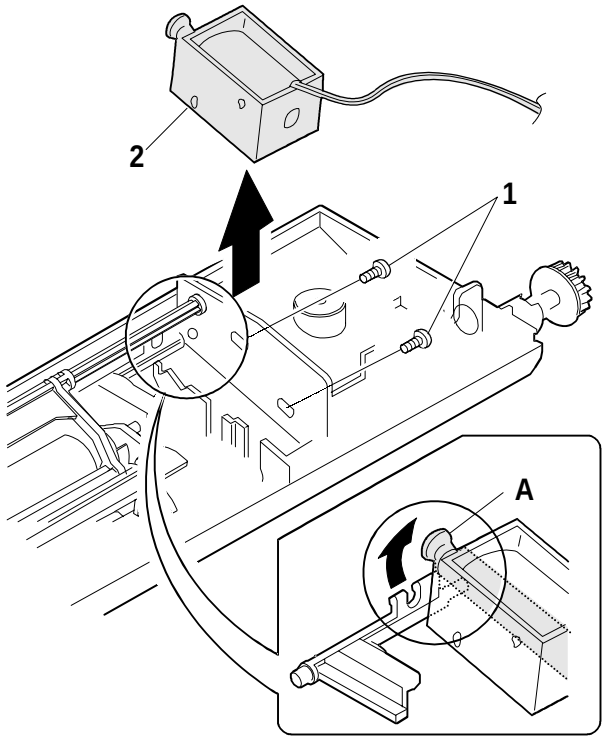
F. Sensor PWB

1) Remove two screws.
2) Remove the sensor PWB.
3) Remove the harness.



G. Pickup solenoid

1) Remove two screws.
2) Remove the pickup solenoid.

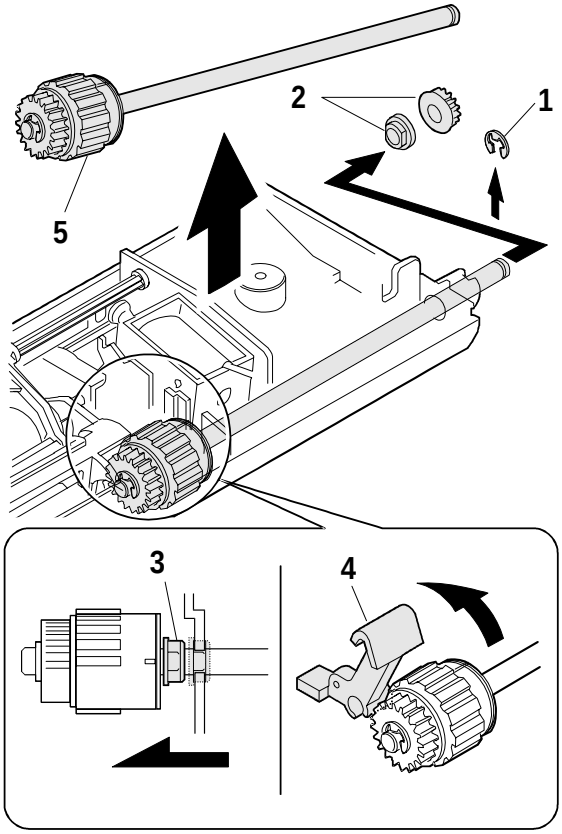


NOTE: When reassembling, hang the iron core on the solenoid arm.

H. Clutch

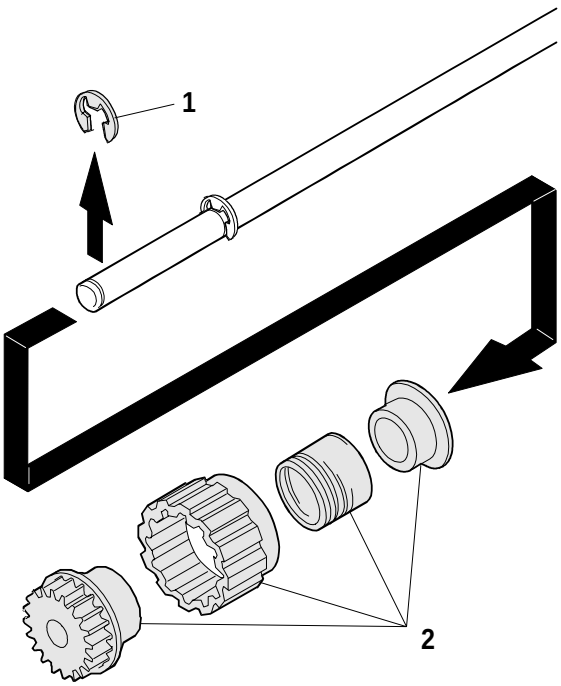
(1) Remove the clutch unit.

1) Remove the E-ring.
2) Remove the pulley and the bushing.
3) Slide the bushing in the arrow direction.
4) Lift the clutch pawl.
5) Remove the clutch unit.



(2) Remove the clutch

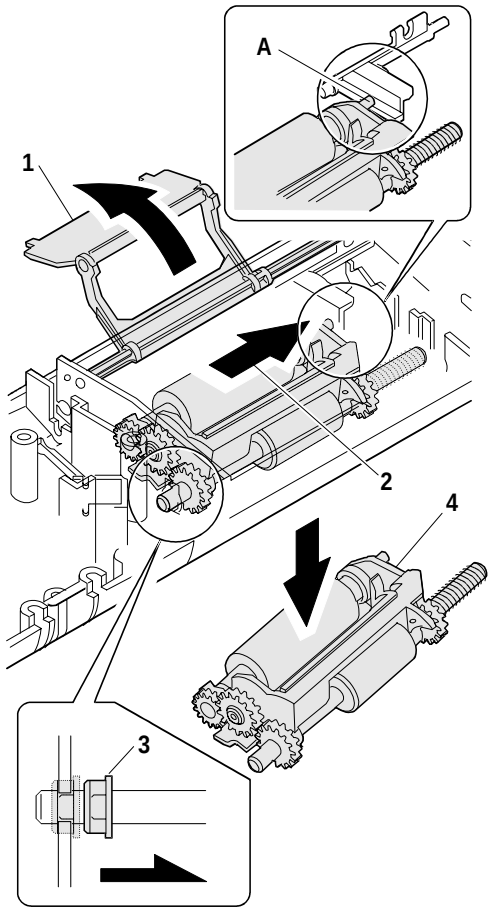
1) Remove the E-ring.
2) Remove the parts.



I. Manual paper feed roller, pickup roller

(1) Remove the pickup unit.

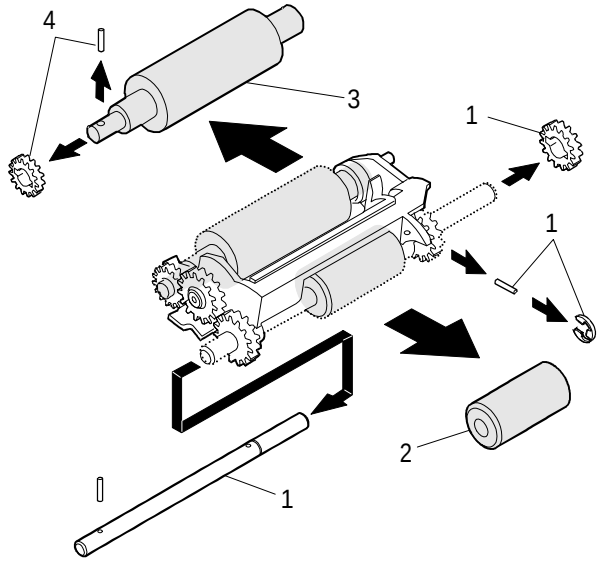
1) Lift the paper stopper.
2) Slide the takeup roller unit.
3) Slide the bushing in the arrow direction.
4) Remove the takeup roller.



NOTE: When reassembling, hang the convex portion of the roller unit on the solenoid arm.

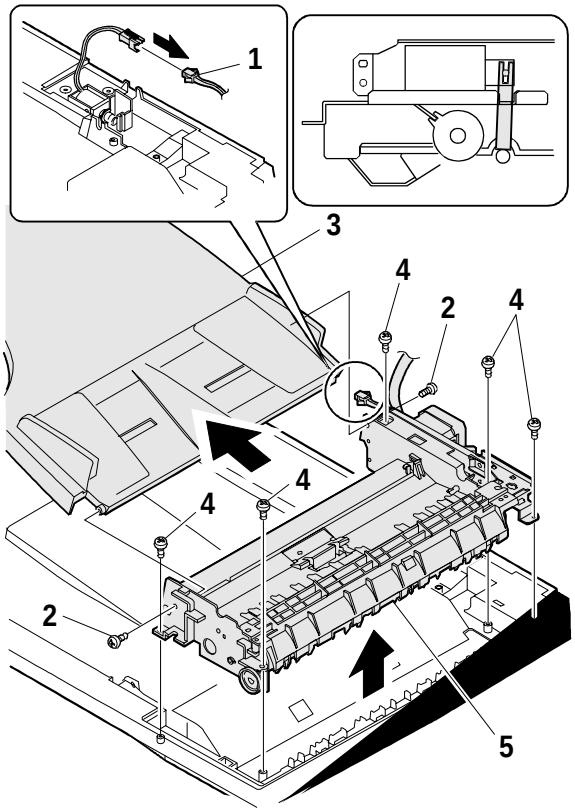
(2) Remove the Manual paper feed roller, pickup roller.

1) Remove the parts.
2) Remove the manual paper feed roller.
3) Remove the pickup roller.
4) Remove the parts.



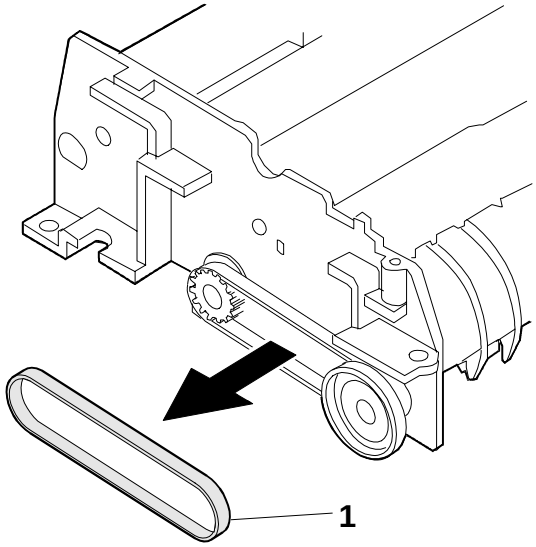
J. Transport unit removal

1) Remove the harness.
2) Remove two screws.
3) Remove the document tray unit.
4) Remove five screws.
5) Remove the transport unit.



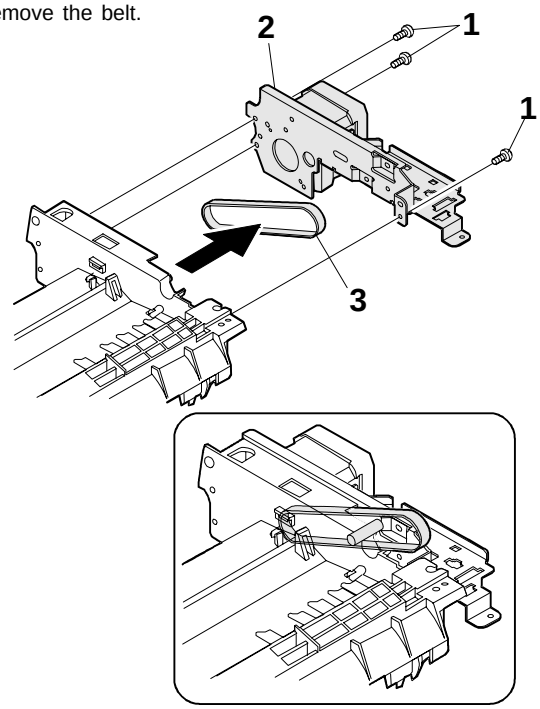
K. Belt 1

1) Remove the belt.



L. Belt 2

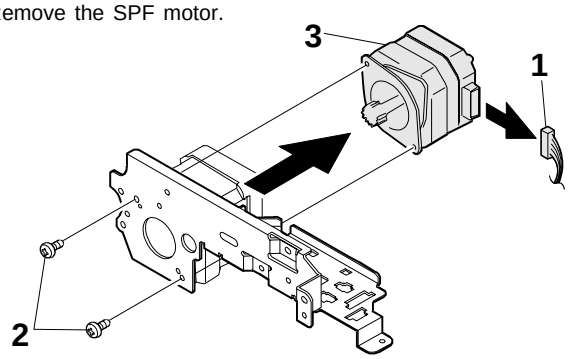
1) Remove three screws.
2) Remove the drive unit.
3) Remove the belt.



NOTE: When reassembling, hang the belt on the boss.

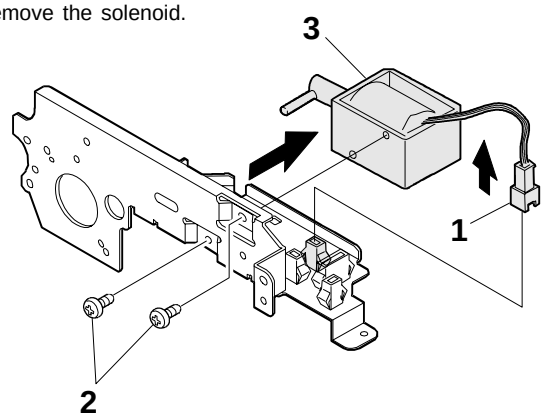
M. SPF motor

1) Remove the harness.
2) Remove two screws.
3) Remove the SPF motor.



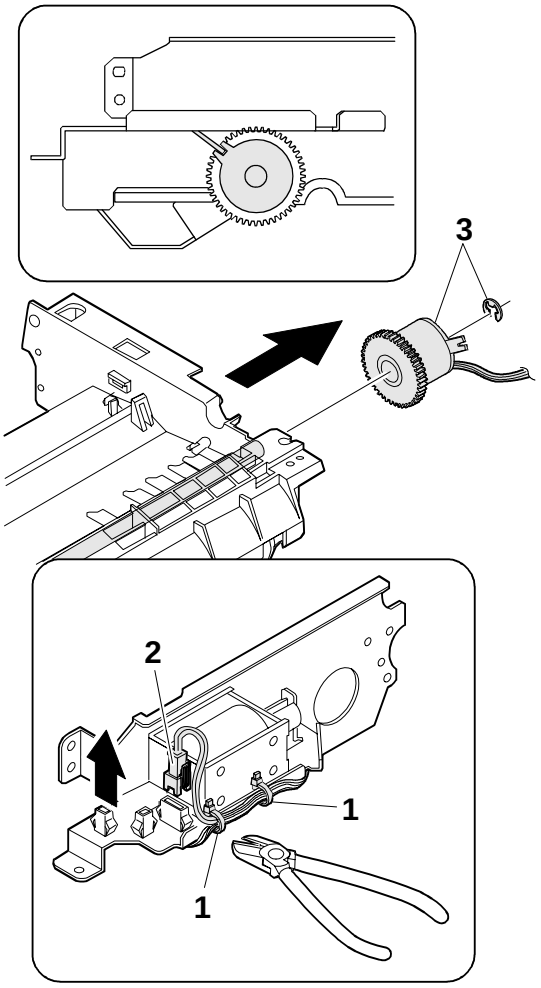
N. Solenoid

1) Remove the harness.
2) Remove two screws.
3) Remove the solenoid.



O. Clutch

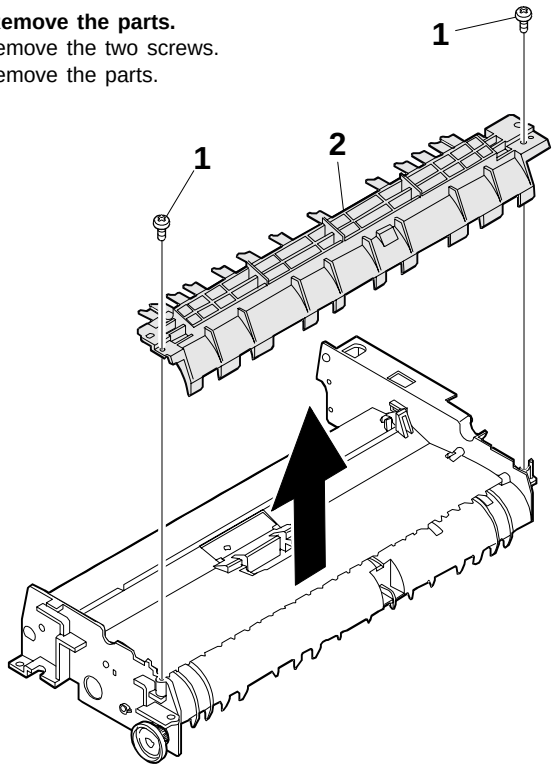
1) Cut the band with nippers.
2) Remove the harness.
3) Remove the clutch.



P. PS roller

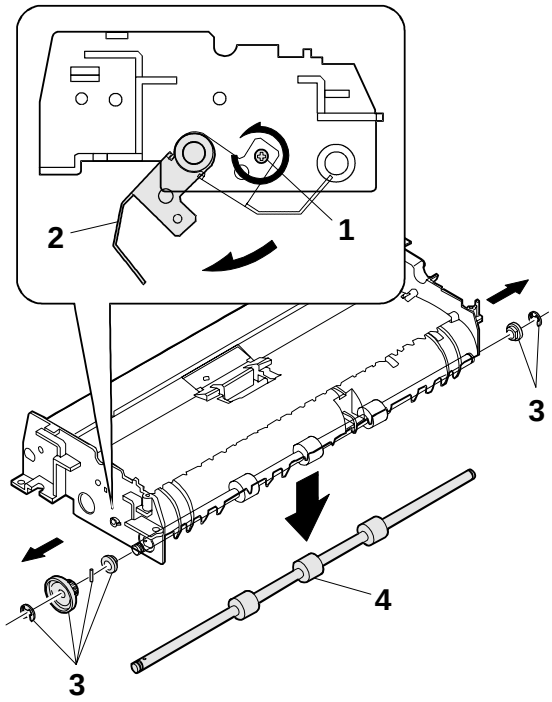
(1) Remove the parts.

1) Remove the two screws.
2) Remove the parts.



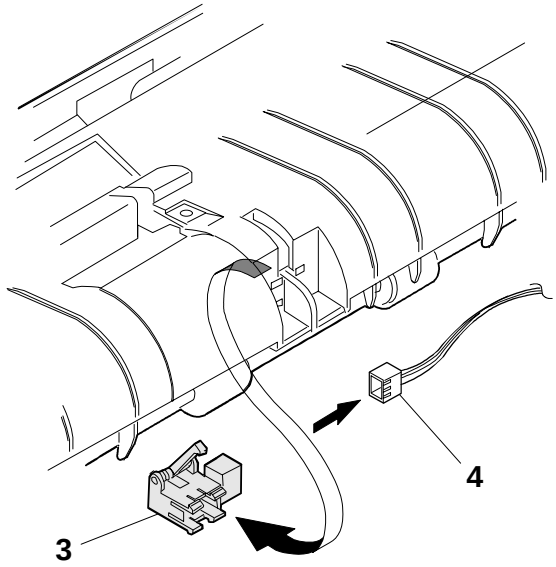
(2) Remove the PS roller.

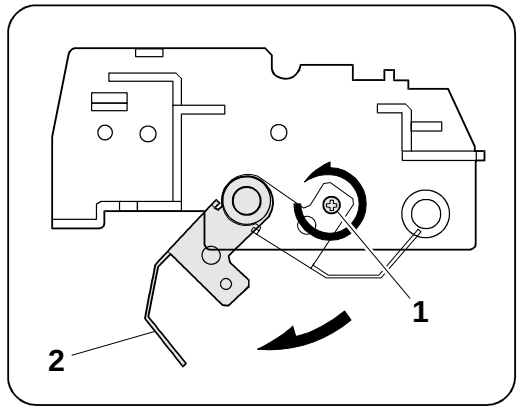
1) Loosen the screw.
2) Open the paper exit PG.
3) Remove the parts.
4) Remove the PS roller.



Q. Paper entry sensor

1) Loosen the screw.
2) Open the paper exit PG.
3) Remove the paper entry sensor.
4) Remove the harness.

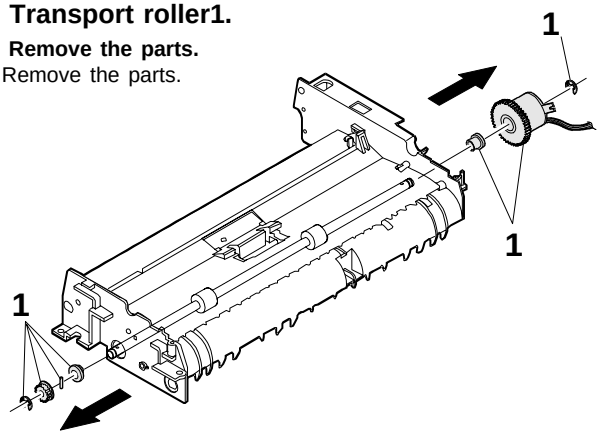




R. Transport roller1.

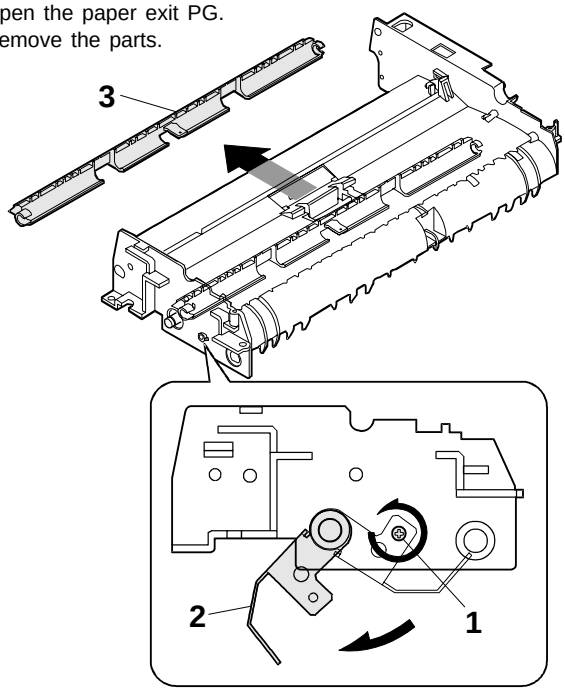
(1) Remove the parts.

1) Remove the parts.



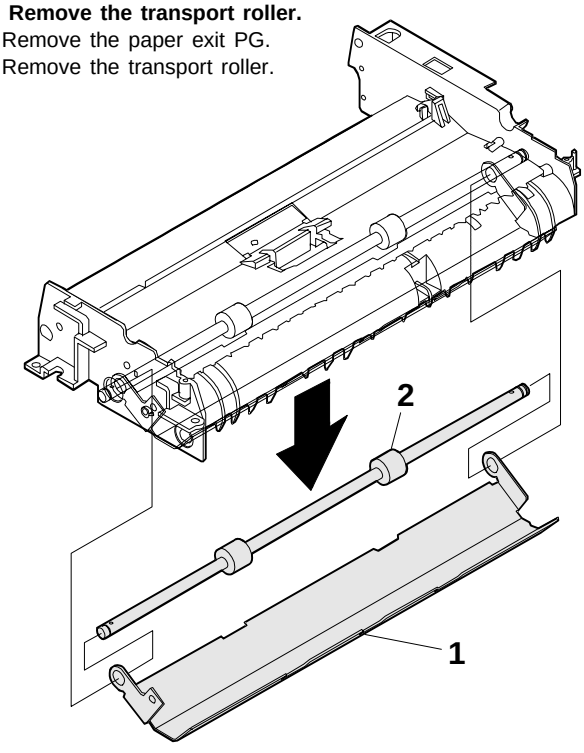
(2) Remove the parts.

1) Loosen the screw.
2) Open the paper exit PG.
3) Remove the parts.



(3) Remove the transport roller.

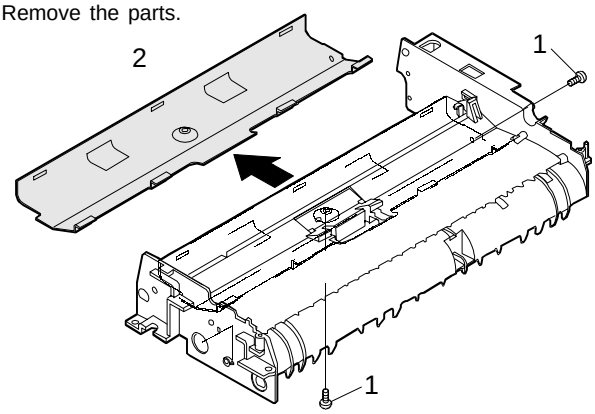
1) Remove the paper exit PG.
2) Remove the transport roller.

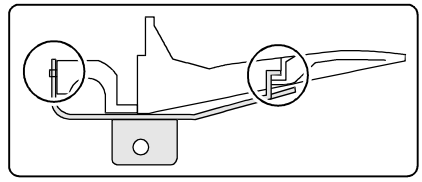


S. Paper exit roller

(1) Remove the parts.

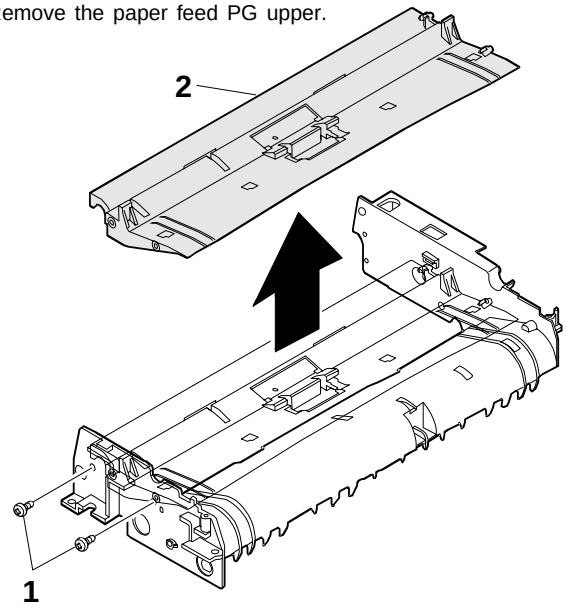
1) Remove two screws.
2) Remove the parts.





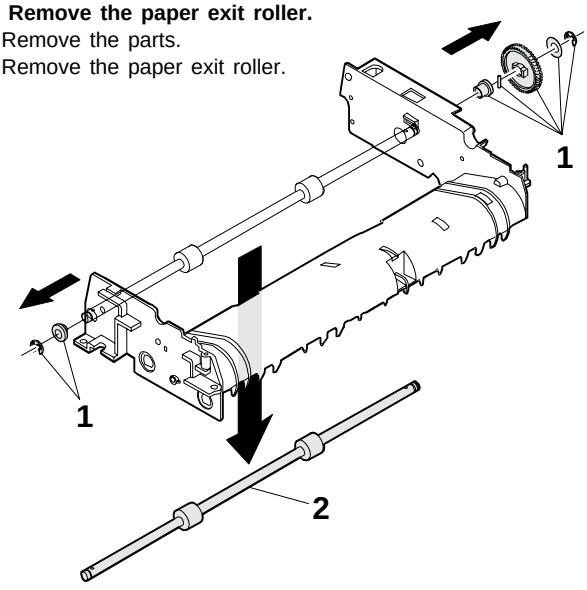
(2) Remove the paper feed PG upper.

1) Remove two screws.
2) Remove the paper feed PG upper.



(3) Remove the paper exit roller.

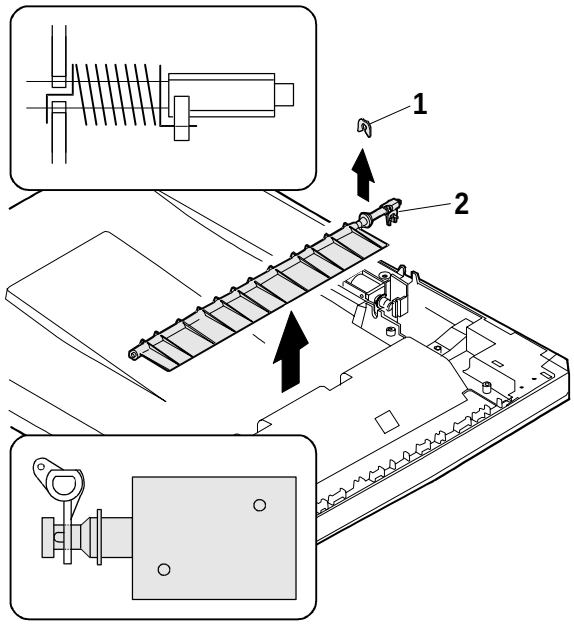
1) Remove the parts.
2) Remove the paper exit roller.



T. Solenoid

(1) Remove the reverse gate

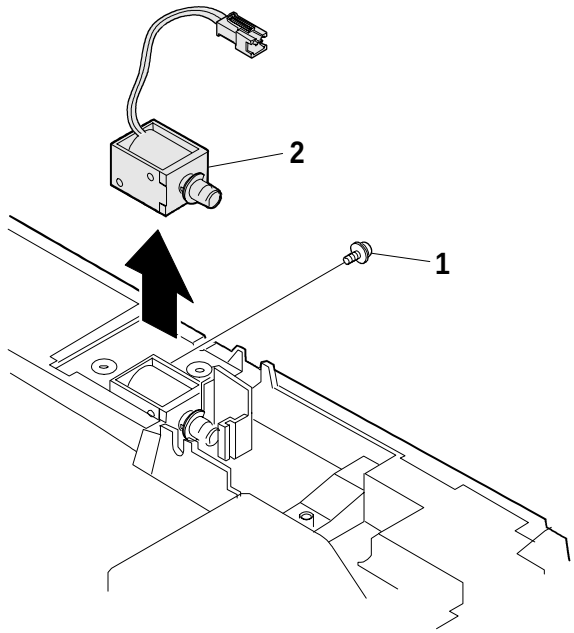
1) Remove the ring
2) Remove the reverse gate



NOTE: When reassembling, be careful of the groove and the hole positions of the spring.
NOTE: When reassembling, hang 2) on the solenoid.

(2) Remove the solenoid.

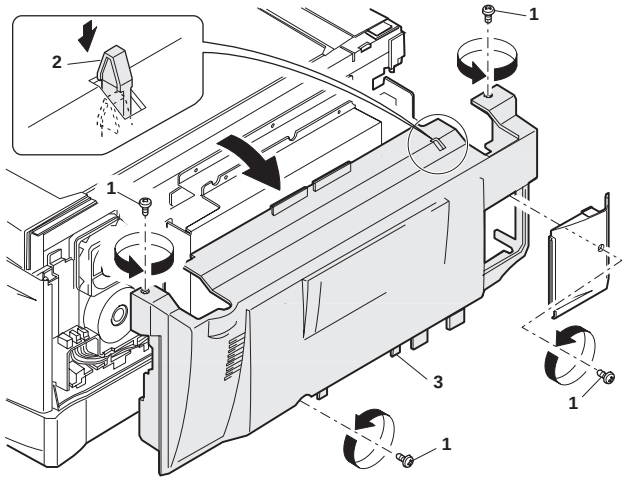
1) Remove the screw.
2) Remove the solenoid.



14. FAX, MCU PWB section (AR-F152 only)

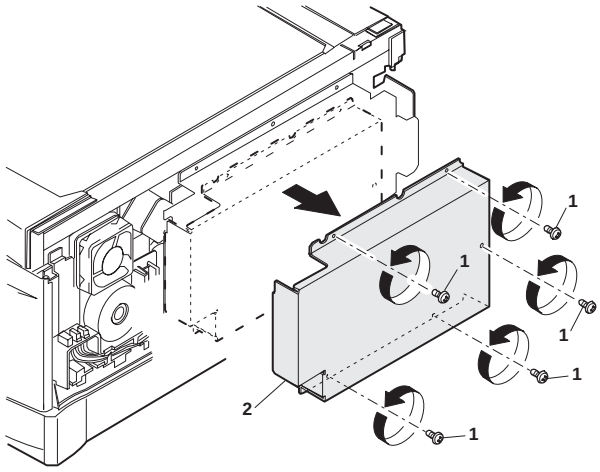
A. Remove the rear cover.

1) Remove four screws.
2) Hold the SPF sensor.
3) Remove the rear cover.



B. Remove the PWB cover FAX2.

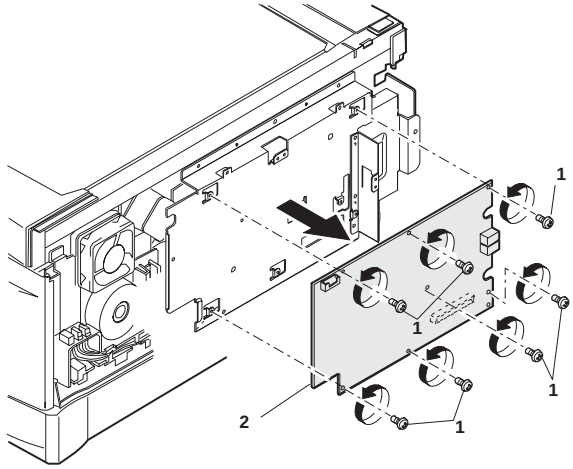
1) Remove five screws.
2) Remove the PWB cover FAX2.



C. Remove the FAX PWB.

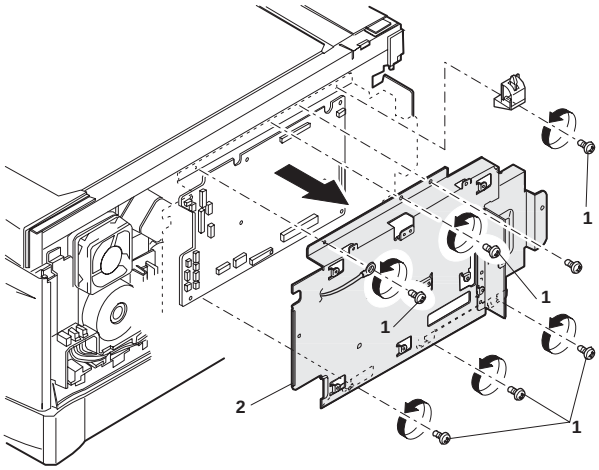
Remove the connector.

1) Remove seven screws.
2) Remove the FAX PWB.



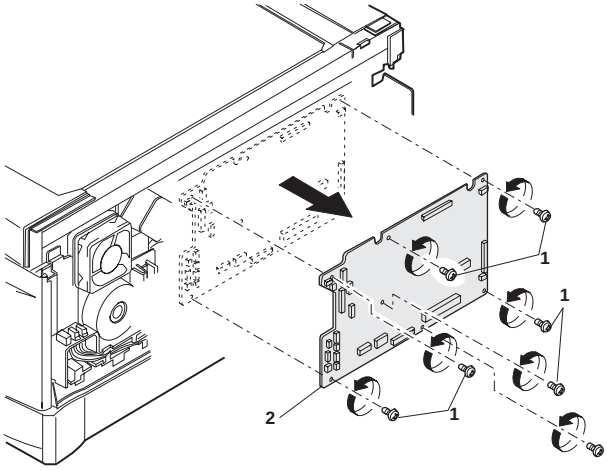
D. Remove the PWB cover FAX.

1) Remove six screws.
2) Remove the PWB cover FAX.



E. Remove the MCU PWB.

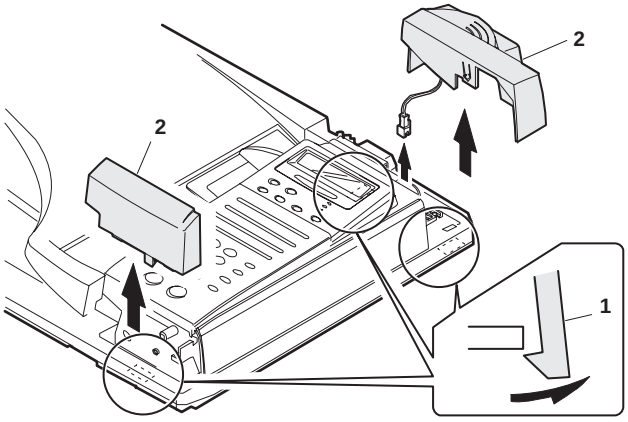
Disconnect the connectors.
1) Remove seven screws.
2) Remove the MCU PWB.



15. FAX-SPF section (AR-F152 only)

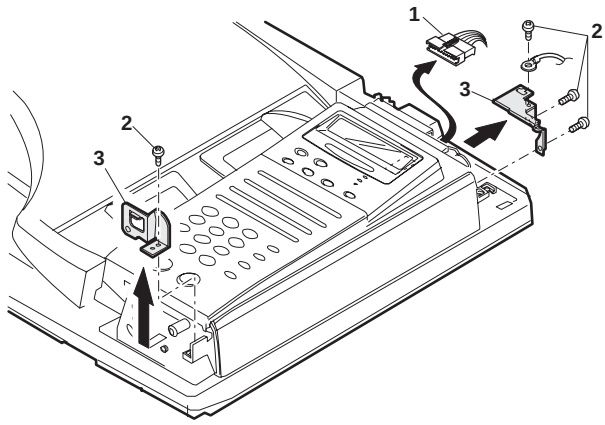
A. Remove the front and the rear covers.

1) Disengage three pawls.
2) Remove the front and the rear covers.



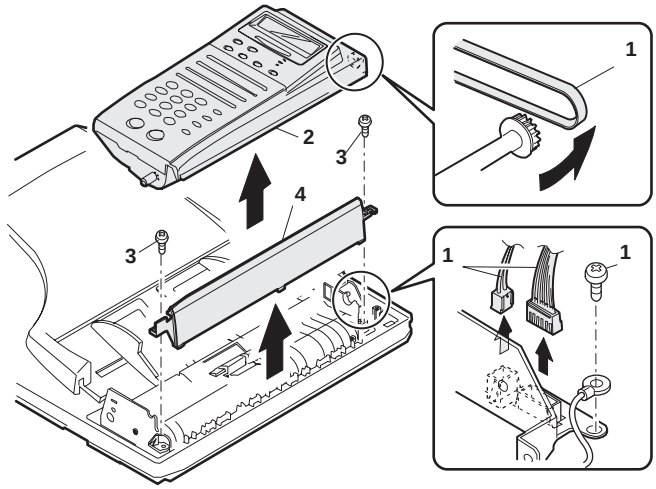
B. Remove the metal fixtures.

1) Disconnect the connector.
2) Remove four screws.
3) Remove the metal fixtures F and R.

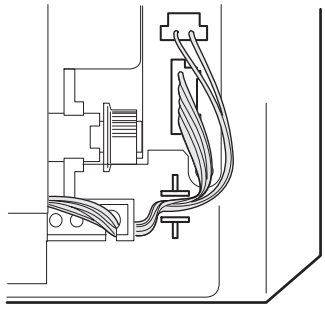


C. Remove the FAX operation panel.

1) Remove the belt, the screw, and two connectors.
2) Remove the FAX operation panel.
3) Remove two screws.
4) Remove U-turn PG.

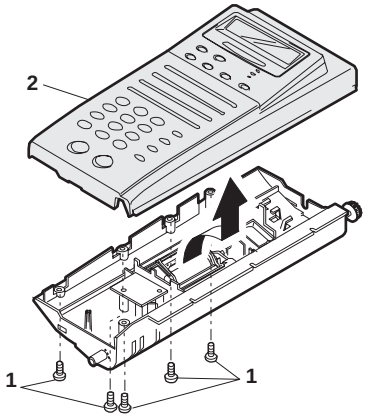


Wiring



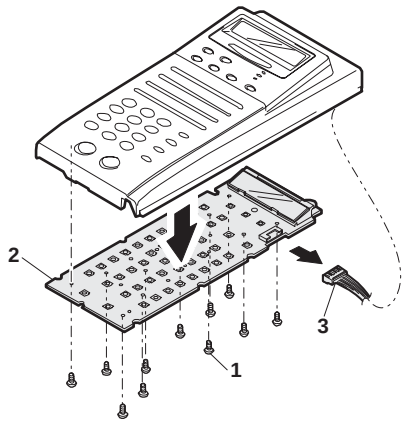
D. Remove the FAX operation panel unit.

1) Remove five screws.
2) Remove the FAX operation panel unit.



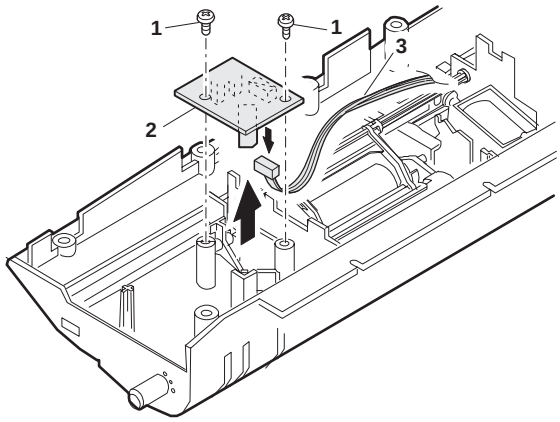
E. Remove the Fax panel PWB.

1) Remove eleven screws.
2) Remove the FAX panel PWB.
3) Remove the connector.



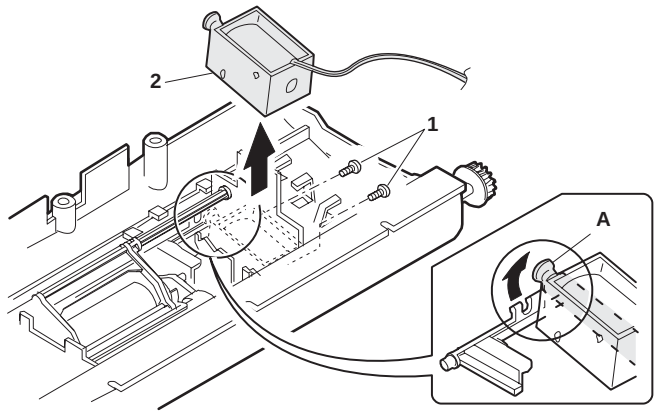
F. Remove the FAX sensor PWB.

1) Remove two screws.
2) Remove the FAX sensor PWB.
3) Remove the connector.



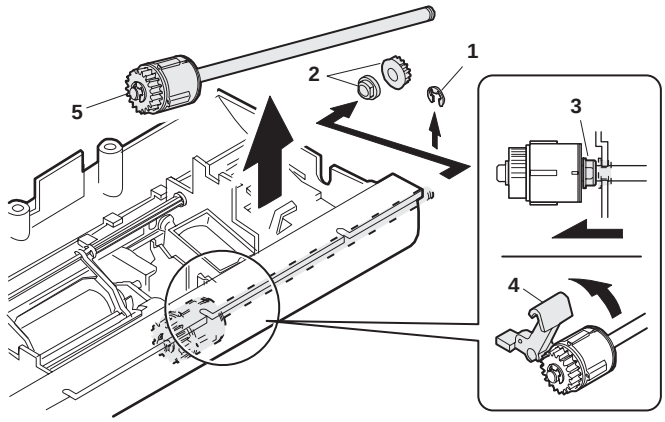
G. Remove the PU solenoid

1) Remove two screws.
2) Remove the PU solenoid.



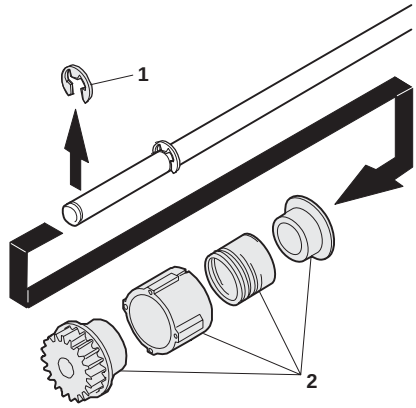
H. Remove the clutch unit.

1) Remove the E-ring.
2) the pulley, and the bushing.
3) Slide the bushing in the arrow direction.
4) Lift the clutch pawl.
5) Remove the clutch unit.



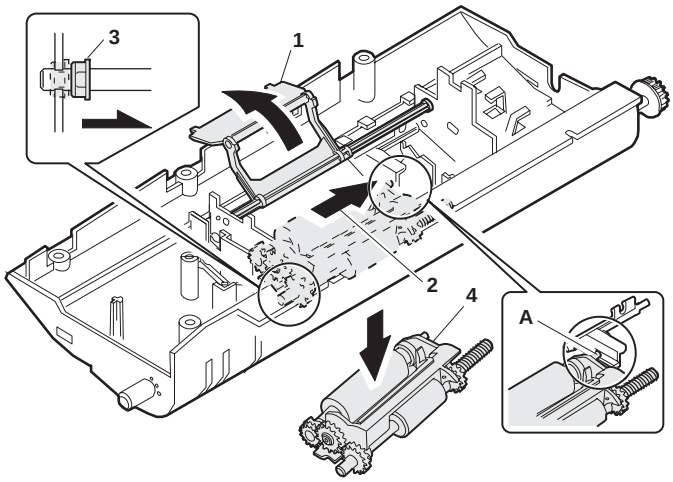
I. Remove the clutch

1) Remove the E-ring.
2) Remove the parts.



J. Remove the pickup unit.

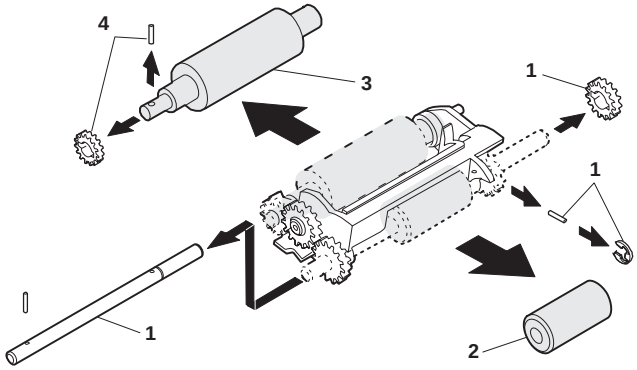
1) Lift the paper stopper.
2) Slide the pickup roller unit in the arrow direction.
3) Slide the bushing.
4) Remove the pickup roller unit.



(Note) When installing, hang the projection of the roller unit on the solenoid arm.

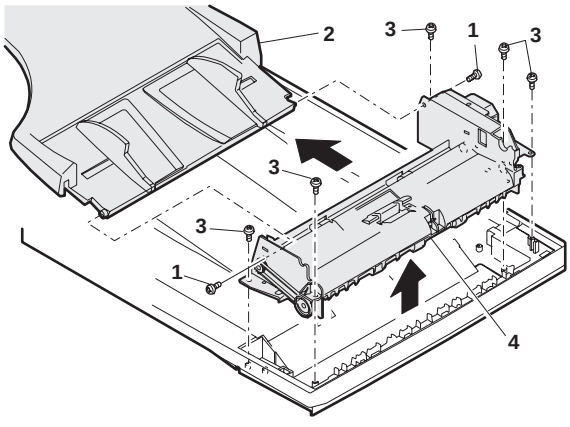
K. Remove the manual feed roller and the pickup roller.

1) Remove the parts.
2) Remove the manual feed roller.
3) Remove the pickup roller and the parts.



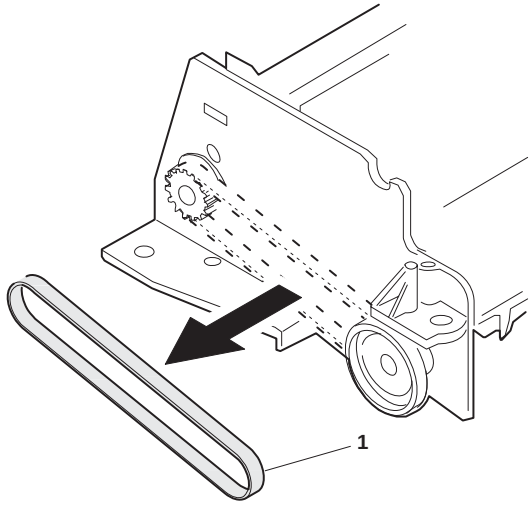
L. Remove the transport unit.

1) Remove the connector.
2) Remove two screws.
3) Remove the document tray unit.
4) Remove four screws.
5) Remove the transport unit.



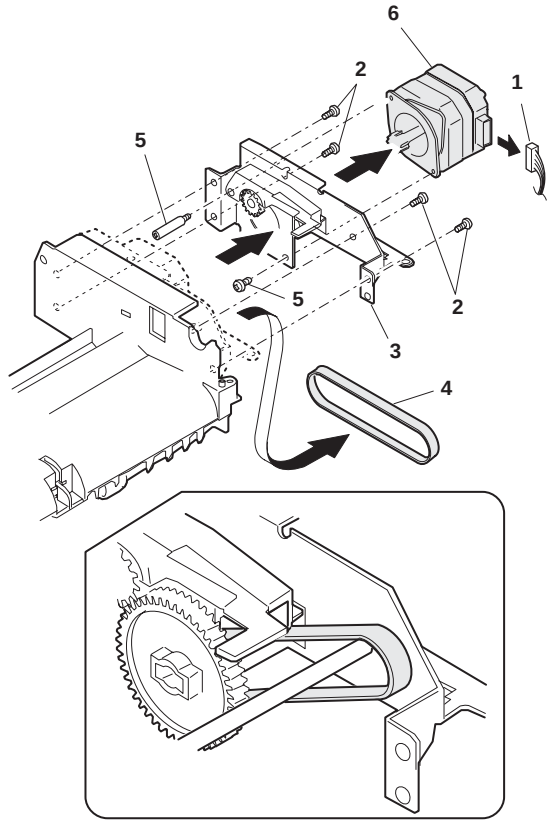
M. Remove the belt.

1) Remove the belt.



N. Remove the SPF motor.

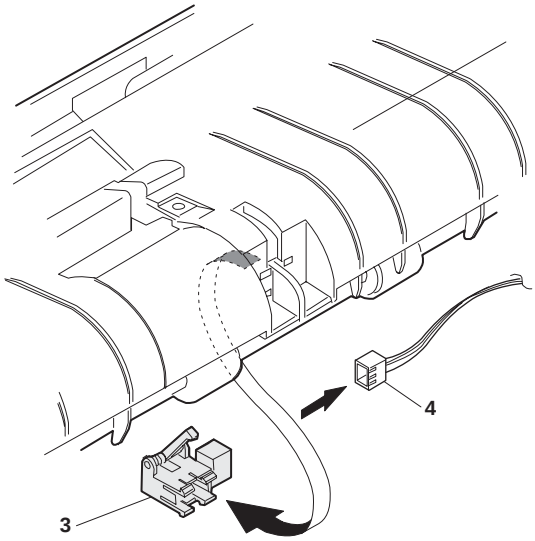
1) Remove the connector.
2) Remove four screws.
3) Remove the drive frame.
4) Remove the belt.
5) Remove two screws.
6) Remove the SPF motor.

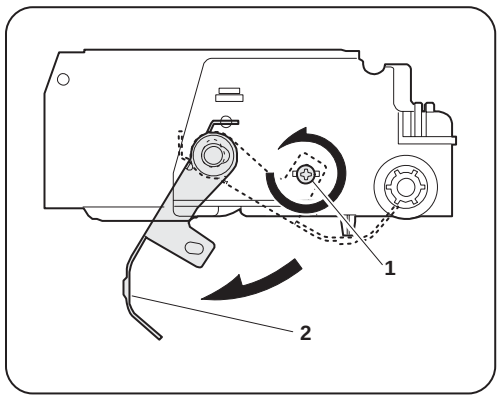


(Note) When installing, attach the belt as shown in the figure.

O. Remove the paper entry sensor.

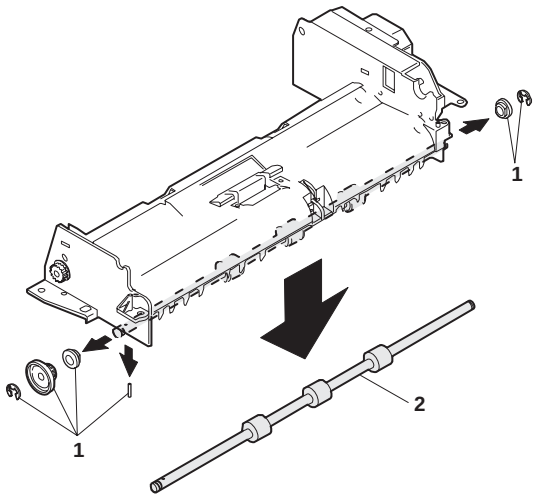
1) Loosen the screw.
2) Open the paper exit PG.
3) Remove the paper entry sensor.
4) Remove the connector.





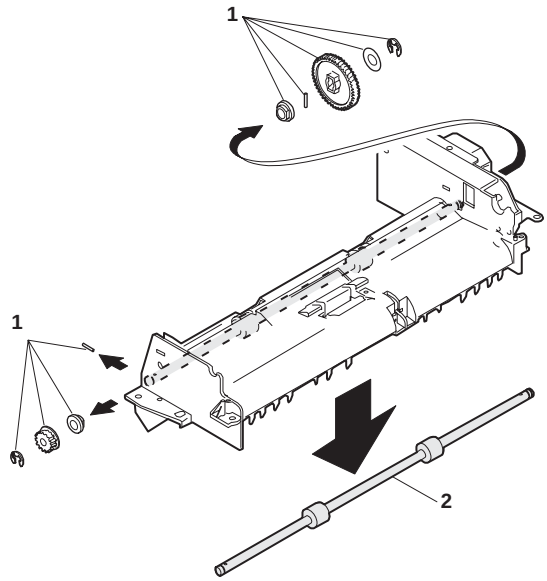
P. Remove the PS roller.

1) Remove the parts.
2) Remove the PS roller.



Q. Remove the paper exit roller.

1) Remove the parts.
2) Remove the paper exit roller.



16. Procedures after replacement of FAX ROM (AR-F152 only)

After replacement of FAX ROM, perform the following procedures.

- Perform the FAX software switch clear and the FAX image memory clear.

1) FAX software clear procedure
   On the Fax operation panel: FUNCTION → 9 → ∗ → 8 → # → ENTER → 0 → 2 → 1
2) FAX image memory clear procedure
   On the FAX operation panel: FUNCTION → 9 → ∗ → 8 → # → ENTER → 1 → 0 → 1

(Note)

When the ROM version is upgraded, the area used by each job for D-RAM memory area may vary. Therefore, this procedure must be performed after repalcement of ROM to stabilize the operation.

Perform this procedure immediately after turning OFF/ON the power after replacement of ROM.

[8] ADJUSTMENT

1. Optical section

A. Image distortion adjustment

There are following two types of image distortion.

- Horizontal image distortion
- Vertical image distortion

In this machine, the image distortion is adjusted by changing the parallelism of mirrors (copy lamp unit, No. 2/3 mirror unit).

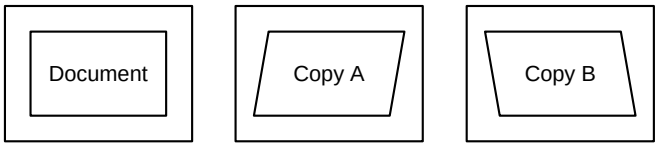
(1) Horizontal image distortion adjustment

a. Summary

Parallelism of mirrors can be made by installing the copy lamp unit and No. 2/3 mirror unit to the reference position. However, it must be checked by making a copy, and must be adjusted if necessary.

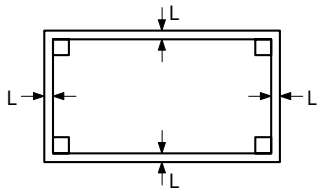
b. Cases when the adjustment is required

1) When the copy lamp unit and No.2/3 mirror unit are disassembled or their part is replaced.
2) When the copy lamp unit and No.2/3 mirror unit drive section is disassembled or its part is replaced.
3) When the copy image is distorted as shown below:



c. Necessary tools

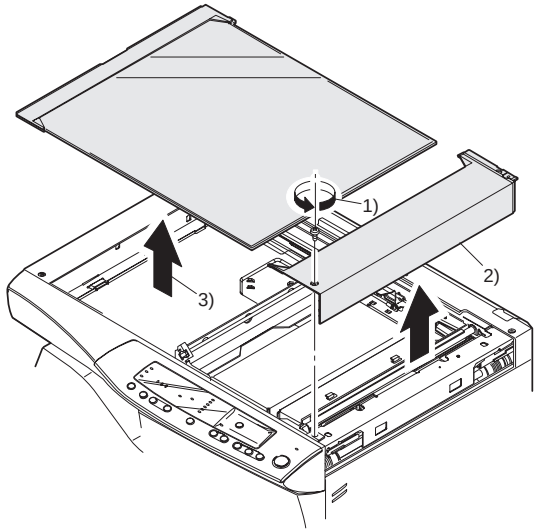
- Screwdriver (+)
- Hex wrench
- Scale
- Test chart for distortion adjustment (Make a chart shown below by yourself.)
  Draw a rectangle on a paper (B4 or 8 1/2″ × 14″) as shown below.
  Be sure to make four right angles.



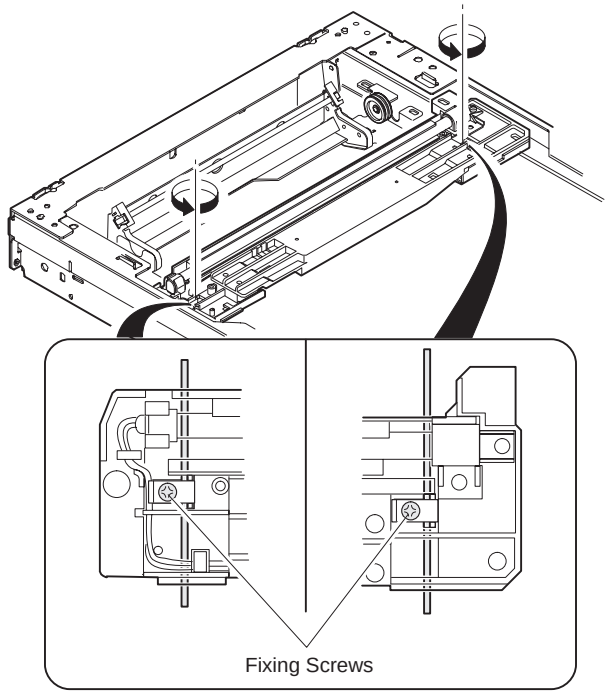
L = 10mm

d. Adjustment procedure

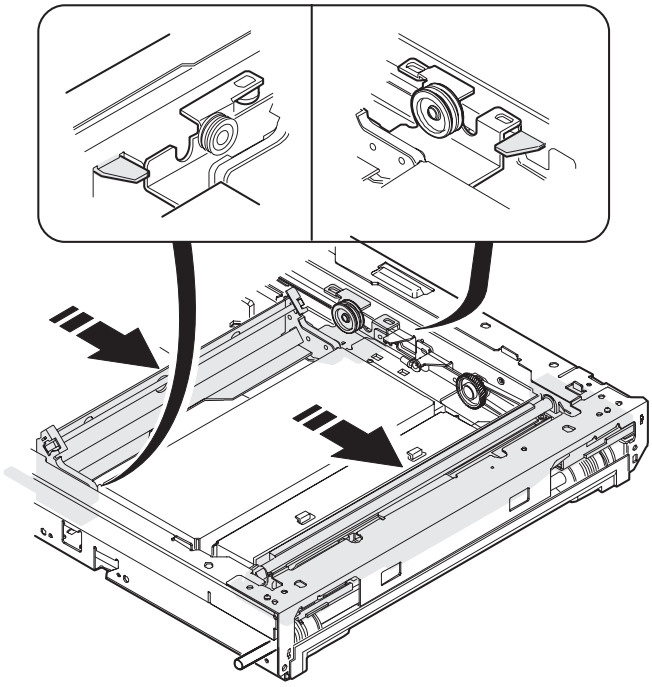
1) Remove the right cabinet (manual paper feed unit), the document reference plate.
2) Remove the document glass.



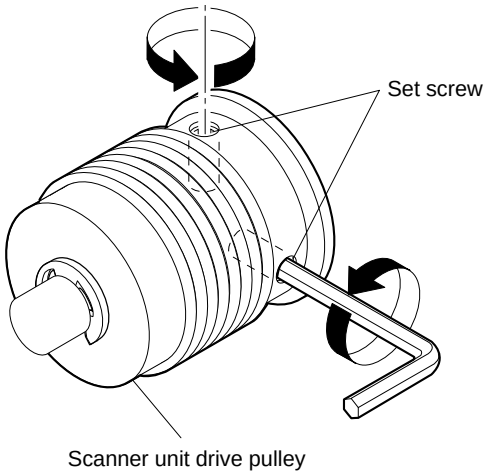
3) Loosen the fixing screw of the copy lamp unit wire.



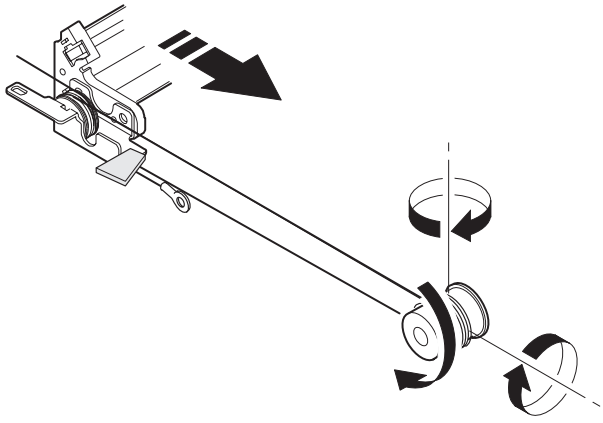
4) Manually turn the copy lamp unit/No.2/3 mirror unit drive gear to bring No.2/3 mirror unit into contact with No.2/3 mirror unit positioning plate. When No.2/3 mirror unit makes contact with No.2/3 mirror unit positioning plate in the Freat and rear frame side simultaneously, the mechanical parallelism of No.2/3 mirror unit is proper.
   If one side of No.2/3 mirror unit makes contact with No.2/3 mirror unit positioning plate and the other side does not, the parallelism is improper.
   If the parallelism is improper, perform the procedure of step 5).



5) Loosen the copy lamp unit/No.2/3 mirror unit drive pulley setscrew in the side where No.2/3 mirror unit does not make contact with No.2/3 mirror unit positioning plate.

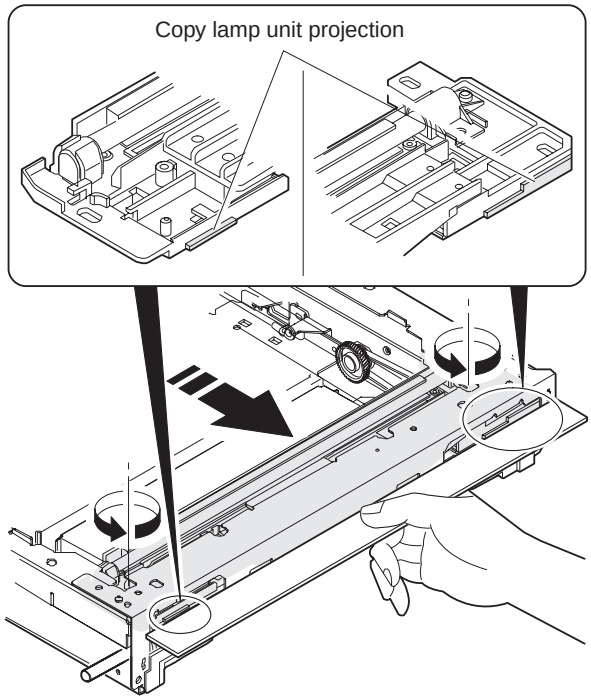


6) Without moving the copy lamp unit/No.2/3 mirror unit drive pulley shaft, manually turn the copy lamp unit/No.2/3 mirror unit drive pulley in the same direction of the loosened setscrew. When it makes contact with No.2/3 mirror unit positioning plate, tighten and fix the setscrew.

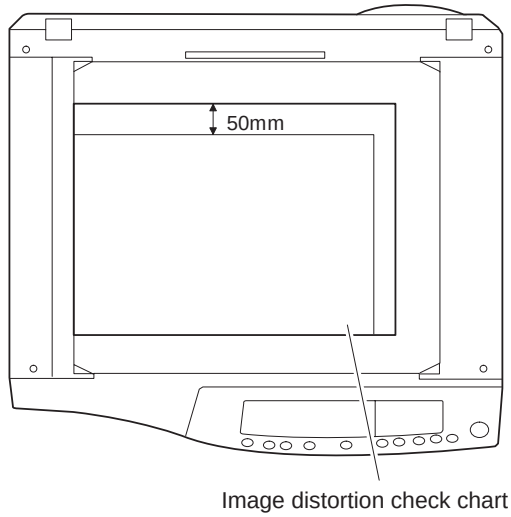


7) Manually turn the copy lamp unit/No.2/3 mirror unit drive gear to bring No.2/3 mirror unit into contact with the positioning plate, and perform the procedure of step 4).
Repeat procedures of steps 4) to 7) until the parallelism of No.2/3 mirror unit is properly set.

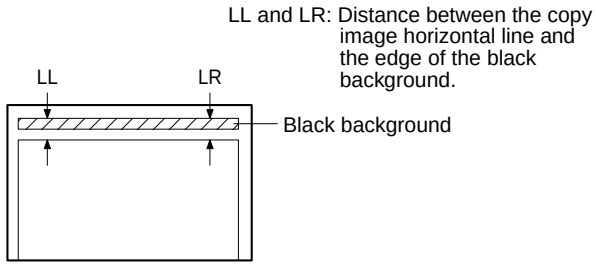
8) With No.2/3 mirror unit positioning plate in contact with No.2/3 mirror unit, bring the copy lamp unit into contact with the right frame and fix the copy lamp unit to the drive wire.
Procedures 1) to 8) are for adjustment of mechanical horizontal parallelism. The copy lamp unit and No.2/3 mirror are fixed to the specified positions and the mechanical horizontal parallelism of No.2/3 mirror is adjusted.
Then the optical horizontal parallelism must be adjusted in the following procedures.



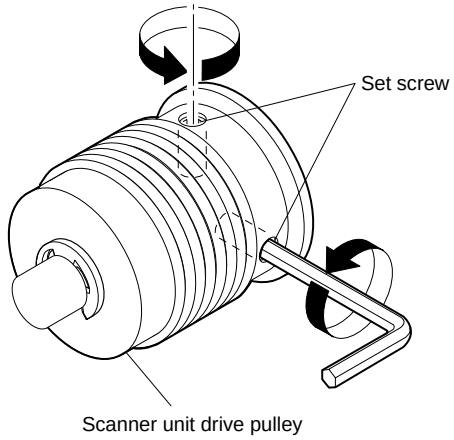
9) Set the image distortion check chart on the document table, and make a reduction copy (75%) on an A4 or 11″ × 8 1/2″ paper with the document cover open.



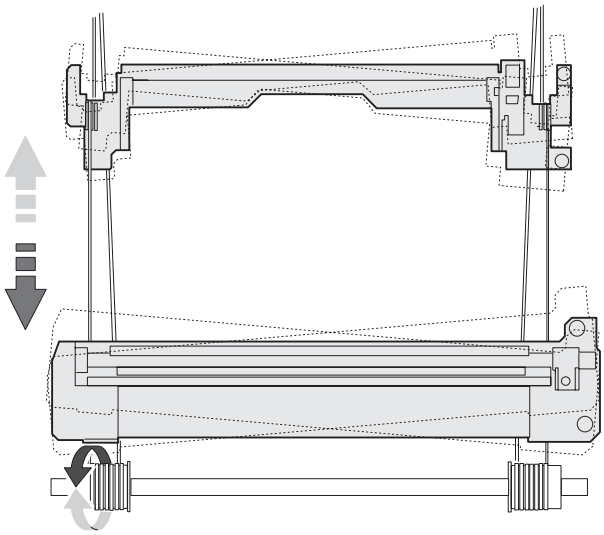
10) Check the horizontal image distortion.
If LL = LR, there is no horizontal distortion



11) If LL is not equal to LR, perform the following procedure.
Loosen the setscrew of the copy lamp unit/No.2/3 mirror unit drive pulley in the front or the rear frame.



12) Without moving the copy lamp unit/No.2/3 mirror unit drive pulley shaft, manually turn the copy lamp unit/No.2/3 mirror unit drive pulley whose setscrew was loosened, and adjust the parallelism of copy lamp unit/No.2/3 mirror unit.



13) Tighten the set screw of the copy lamp unit/No.2/3 mirror unit drive pulley.

14) Check the image distortion in the same manner as step 10). Repeat procedures 11) to 14) until horizontal image distortion is eliminated.

(2) Vertical image distortion adjustment

a. Summary

In this adjustment, the left and right balance is adjusted by changing the left and right balance of the No. 2 scanner unit frame on the front frame side.

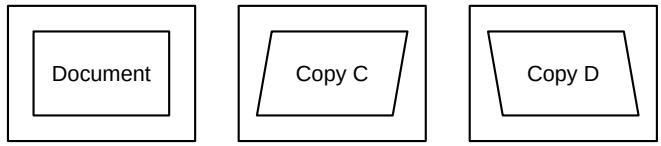
b. Note

- Horizontal image distortion adjustment

c. Cases when the adjustment is required

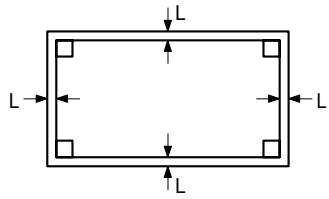
1) When the copy lamp unit/No.2/3 mirror unit drive section is disassembled or its part is replaced.

2) When the copy image is distorted as follows:



d. Necessary tools

- Screwdriver (+)
- Screwdriver (–)
- Scale
- Test chart for distortion adjustment (Make by yourself.)
  Draw a rectangle on A4 or 8 1/2″ × 11″ paper as shown below:
  Be sure to make four right angles.



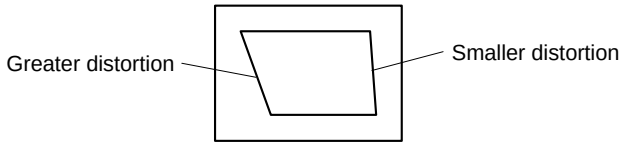
L = 10mm

e. Adjustment procedure

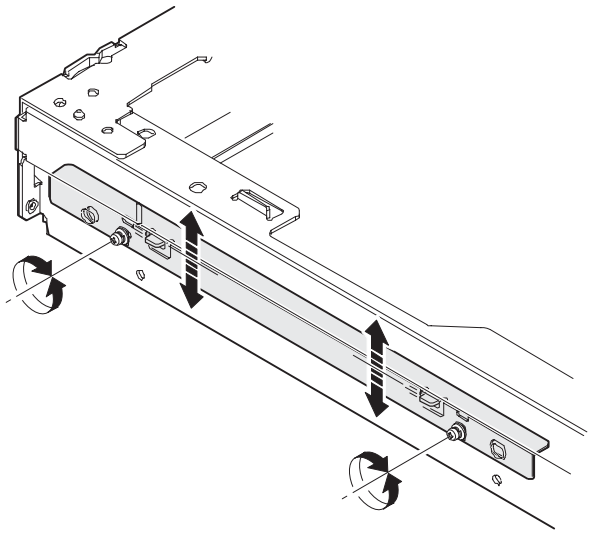
1) Set the test chart for image distortion adjustment on the document glass, and make a normal copy on a paper of A4 or 8 1/2″ × 11″.

2) Check image distortion in the right and the left sides.
If the both vertical lines are in parallel with each other, the right-left distortion balance is proper. (However, there may be some distortion.)

If all the four angles are right angles, there in no distortion and the following procedures are not required.

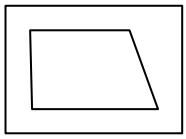


3) If the right-left distortion balance is improper, loosen the fixing screw of No.2/3 mirror unit rail to change and adjust the right-left balance of No.2/3 mirror unit rail.

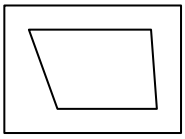


(Note)

If the distortion in the lead edge side (when viewed in the paper transport direction) is greater, change the height of the left rail of No.2/3 mirror unit.
If the distortion in the rear edge side (when viewed in the paper transport direction) is greater, change the height of the right rail of No.2/3 mirror unit.

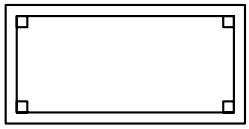


Change the height of the right side of the rail.



Change the height of the left side of the rail.

4) Make a copy to check the vertical image distortion.
If the four angles are right angles, the adjustment is completed.



B. Copy magnification ratio adjustment

The copy magnification ratio must be adjusted in the main scanning direction and in the sub scanning direction. To adjust, use SIM 48-1.

(1) Outline

The main scanning (front/rear) direction magnification ratio adjustment is made automatically or manually.

Automatic adjustment: The width of the reference line marked on the shading correction plate is scanned to perform the main scanning (front/rear) direction magnification ratio adjustment automatically.

Manual adjustment: The adjustment is made by manual key operations. (In either of the automatic and manual adjustments, the zoom data register set value is changed for adjustment.)

The magnification ratio in the sub scanning direction is adjusted by changing the mirror base (scanner) scanning speed.

(2) Main scanning direction magnification ratio adjustment

a. Note

Before performing this adjustment, the following adjustments must have been completed. If not, this adjustment cannot be performed properly.

- Image distortion adjustment
- The lens unit must be installed in the reference position.

b. Cases when the adjustment is required

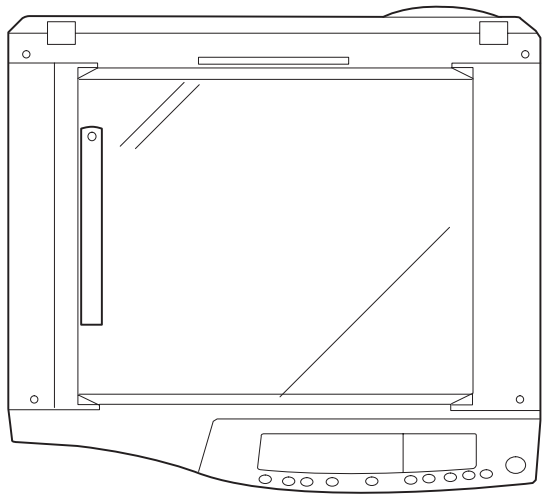
1) When the lens and the mirror unit are disassembled or the part is replaced.
2) When the copy lamp unit/No.2/3 mirror unit drive section is disassembled or the part is replaced.
3) When the main PWB is replaced.
4) When the EEPROM in the main PWB is replaced.
5) When “U2” trouble occurs.
6) When the copy image distortion adjustment is performed.

c. Necessary tools

- Screwdriver (+)
- Scale

d. Adjustment procedure

1) Set the scale vertically on the document table. (Use a long scale for precise adjustment.)

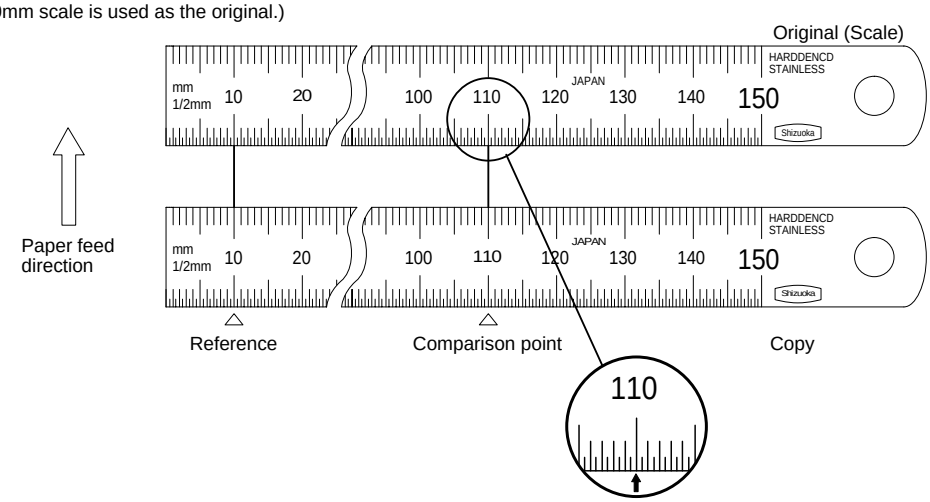


2) Set the copy magnification ratio to 100%.
3) Make a copy on A4 or 8½″ × 11″ paper.

4) Measure the length of the copied scale image.

5) Calculate the main scanning direction magnification ratio.
Main scanning direction magnification ratio
$= \frac{\text{Copy image dimensions}}{\text{Original dimension}} \times 100\ (\%)$

(When a 100mm scale is used as the original.)



6) Check that the copy magnification ratio is within the specified range. If it is not within the specified range, perform the following procedures.

7) Execute SIM 48-1 to select the main scanning direction copy magnification ratio adjustment mode.
To select the adjustment mode, use the copy mode select key.

In the case of the automatic adjustment, when the PRINT switch is pressed, the mirror base unit moves to the white plate for shading to scan the width of the reference line, calculating the correction value and displaying and storing this value.
After execution of the automatic adjustment, go out from the simulation mode and make a copy to check the magnification ratio.
If the magnification ratio is not in the specified range (100 ±1.0%), manually adjust as follows.

Adjustment mode	Lighting lamp
Main scanning direction auto copy magnification ratio adjustment	Auto exposure lamp ON
Main scanning direction manual copy magnification ratio adjustment	Manual exposure lamp ON
Sub scanning direction copy magnification ratio adjustment	Photo exposure lamp ON

8) Set the adjustment mode to Manual with the copy mode select key.

9) Enter the new set value of main scanning direction copy magnification ratio with the copy quantity set key, and press the COPY button.

10) Change the set value and repeat the adjustment until the ratio is within the speoified range.
When the set value is changed by 1, the magnification ratio is changed by 0.1%.

(3) Sub scanning direction copy magnification ratio

a. Note

Before performing this adjustment, the following adjustments must have been completed. If not, this adjustment cannot be performed properly.

- Image distortion adjustment
- Must be installed to the lens unit reference position.

b. Cases when the adjustment is required

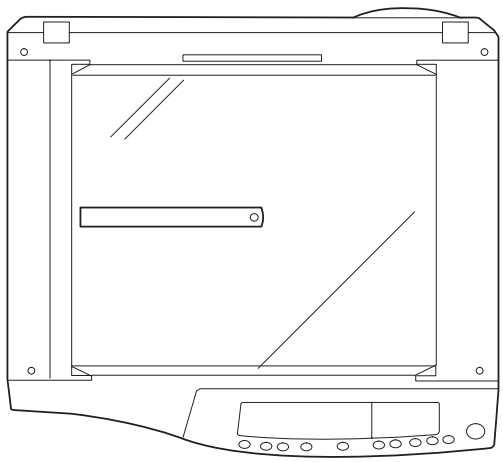
1) When the lens and the mirror unit are disassembled or the part is replaced.
2) When the scanner unit drive section is disassembled or the part is replaced.
3) When the main PWB is replaced.
4) When the EEPROM in the main PWB is replaced.
5) When “U2” trouble occurs.
6) When the copy image distortion adjustment is performed.

c. Necessary tools

- Screwdriver (+)
- Scale

d. Adjustment procedure

1) Set the scale on the document table as shown below. (Use a long scale for precise adjustment.)

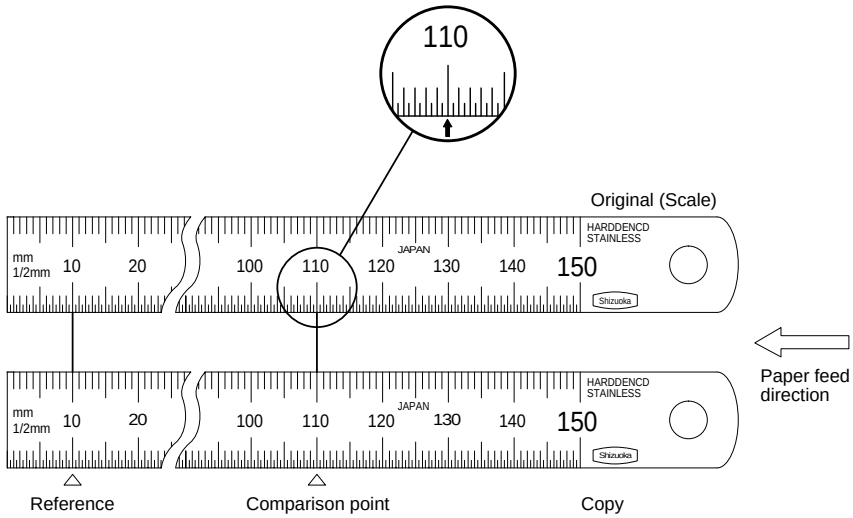


2) Set the copy magnification ratio to 100%.

3) Make a copy on A4 or 8½″ × 11″ paper.

4) Measure the length of the copied scale image.

5) Calculate the sub scanning direction copy magnification ratio.
Sub scanning direction copy magnification ratio
$= \frac{\text{Copy image dimension}}{\text{Original dimension}} \times 100\ (\%)$



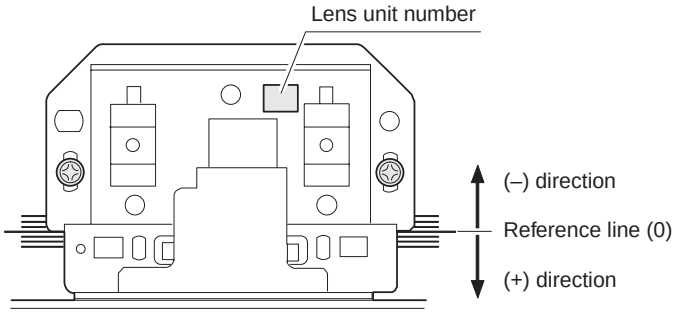
6) Check that the actual copy magnification ratio is within the specified range. (100 ± 1.0%).
   If it is not within the specified range, perform the following procedures.
7) Execute SIM 48-1 to select the sub scanning direction copy magnification ratio adjustment mode.
   To select the adjustment mode, use the copy mode select key. (Photo exposure lamp ON)
8) Enter the new set value of sub scanning direction copy magnification ratio with the copy quantity set key, and press the COPY button.

Repeat procedures 1) — 8) until the sub scanning direction actual copy magnification ratio in 100% copying is within the specified range.

When the set value is changed by 1, the magnification ratio is changed by 0.1%.

C. Lens unit attachment reference

Attach the lens unit so that the lens unit number on the lens adjustment plate is aligned with the scribe line on the base plate.



Example: Lens unit number –2.8
Attach the lens unit at 2 scales in the paper exit direction from the reference line.

Note: Never touch the other screws than the unit attachment screw.
The lens unit is supplied only in a whole unit.

D. Image position adjustment

There are following five kinds of image position adjustments, which are made by laser control except for the image scan start position adjustment. For the adjustments, SIM 50 – 01 and SIM 50 – 10 are used.

No.	Adjustment item	Simulation
1	Print start position	50 – 01
2	Image lead edge void amount	50 – 01
3	Image scan start position	50 – 01
4	Image rear edge void amount	50 – 01
5	Center offset	50 – 10

To select the adjustment mode with SIM 50 – 01, use the copy density select key.
The relationship between the adjustment modes and the lighting lamps are as shown in the table below.

Adjustment mode	Lighting lamp
Print start position	Auto (AE) lamp
Image lead edge void amount	Manual (TEXT) lamp
Image scan start position	Photo lamp
Image rear edge void amount	Auto, Manual, Photo lamps

To select the adjustment mode with SIM 50 – 10, use the copy mode select key.

The relationship between the adjustment modes and the lighting lamps are as shown in the table below.

Machine with the multi manual paper feed unit

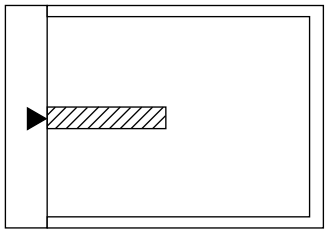
Adjustment mode	Lighting lamp
Print center offset (cassette)	Auto, Cassette
Print center offset (manual feed)	Auto, Manual
Document center offset	Auto, Manual

Machine with the single manual paper feed unit

Print center offset (cassette)	Auto, Cassette
Print center offset (manual feed)	Auto
Document center offset	Auto, Manual

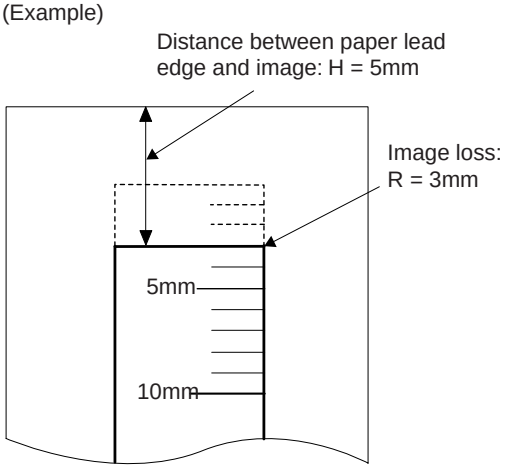
(1) Lead edge adjustment

1) Set a scale to the center of the paper lead edge guide as shown below, and cover it with B4 or 8 1/2″ × 14″ paper.



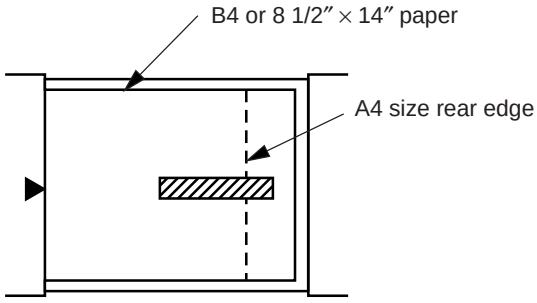
2) Execute SIM 50 – 01
3) Set the print start position (AE lamp ON) (A), the lead edge void amount (TEXT lamp ON) (B), and the scan start position (PHOTO lamp ON) (C) to 0, and make a copy of a scale at 100%.
4) Measure the image loss amount (R mm) of the scale image.
   Set C = 10 × R (mm). (Example: Set the value of C to 30.)
   When the value of C is increased by 10, the image loss is decreased by 1mm. (Default: 50)
5) Measure the distance (H mm) between the paper lead edge and the image print start position.
   Set A = 10 × H (mm). (Example: Set the value of A to 50.)
   When the value of A is increased by 10, the image lead edge is shifted to the paper lead edge by 1mm. (Default: 50)
6) Set the lead edge void amount to B = 50 (2.5mm).
   When the value of B is increased by 10, the void amount is increased by about 1mm. For 25 or less, however, the void amount becomes zero. (Default: 50)

(Example)



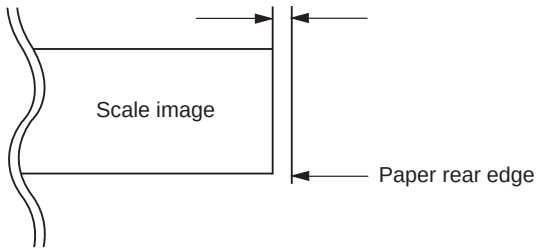
(2) Image rear edge void amount adjustment

1) Set a scale to the rear edge section of A4 or 11″ × 8 1/2″ paper size as shown in the figure below, and cover it with B4 or 8 1/2″ × 14″ paper.



2) Execute SIM 50 – 01 to select the image rear edge void amount adjustment mode.
   The set adjustment value is displayed on the copy quantity display.
3) Make a copy and measure the void amount of image rear edge.

Void amount (Standard value: 2 – 3mm)

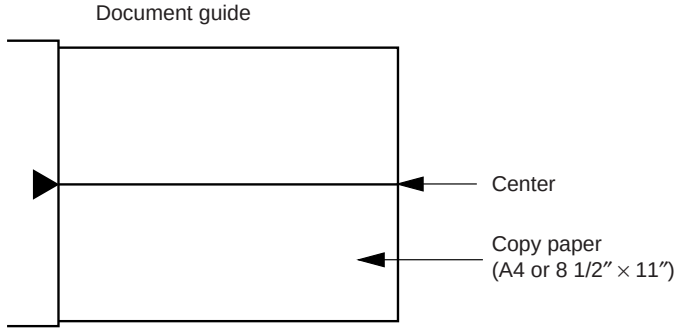


4) If the measurement value is out of the specified range, change the set value and repeat the adjustment procedure.
   The default value is 50.

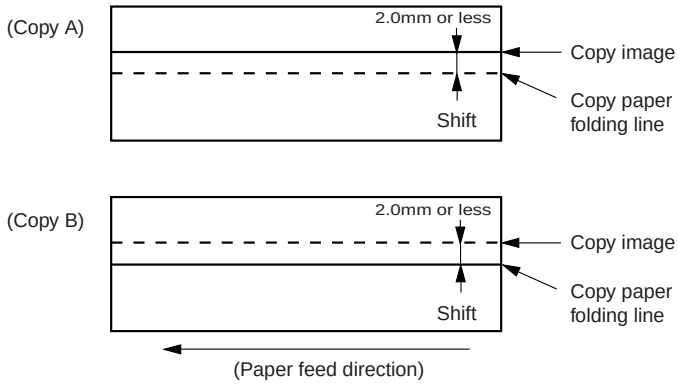
   Note: The rear edge void cannot be checked with the first sheet after entering the simulation mode, the first sheet after turning off/on the power, or the first sheet after inserting the cassette. Use the second or later sheet to check the rear edge void.

(3) Center offset adjustment

1) Set the self-made test chart for the center position adjustment so that its center line is aligned with the center mark of the document guide.
   - Test chart for the center position adjustment
     Draw a line at the center of A4 or 8 1/2″ × 11″ paper in the paper transport direction.



2) Execute SIM 50 – 10 to select the print center offset (cassette paper feed) adjustment mode.
   The set adjustment value is displayed on the copy quantity display.
3) Make a copy and check that the copied center line is properly positioned.
   The standard value is 0 ± 2mm from the paper center.



4) If the measured value is out of the specified range, change the set value and repeat the adjustment procedure.
When the set value is increased by 1, the copy image is shifted by 0.1mm toward the rear frame.
- For the manual paper feed, change the manual paper feed adjustment mode and perform the similar procedures.
- Since the document center offset is automatically adjusted by the CCD which scan the reference lines (F/R) on the back of document guide, there is no need to adjust manually.

2. Copy density adjustment

A. Copy density adjustment timing

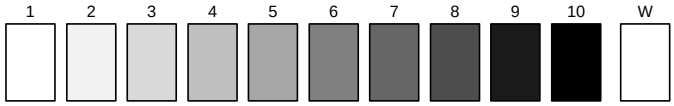
The copy density adjustment must be performed in the following cases:
- When maintenance is performed.
- When the developing bias/grid bias voltage is adjusted.
- When the optical section is cleaned.
- When a part in the optical section is replaced.
- When the optical section is disassembled.
- When the OPC drum is replaced.
- When the main control PWB is replaced.
- When the EEPROM on the main control PWB is replaced.
- When the memory trouble (U2) occurs.

B. Note for copy density adjustment

1) Arrangement before execution of the copy density adjustment
- Clean the optical section.
- Clean or replace the charger wire.
- Check that the voltage at the high voltage section and the developing bias voltage are in the specified range.

C. Necessary tool for copy density adjustment

- One of the following test charts:
UKOG-0162FCZZ, UKOG-0089CSZZ, KODAK GRAY SCALE
- B4 (14″ × 8 1/2″) white paper
- The user program AE setting should be “3.”



Test chart comparison table

UKOG-0162FCZZ DENSITY No.	1	2	3	4	5	6	7	8	9	10	W
UKOG-0089CSZZ DENSITY No.	0.1		0.2		0.3				0.5	1.9	0
KODAK GRAY SCALE		1		2		3		4		19	A

D. Features of copy density adjustment

For the copy density adjustment, the image data shift function provided in the image process LSI is used.

List of the adjustment modes

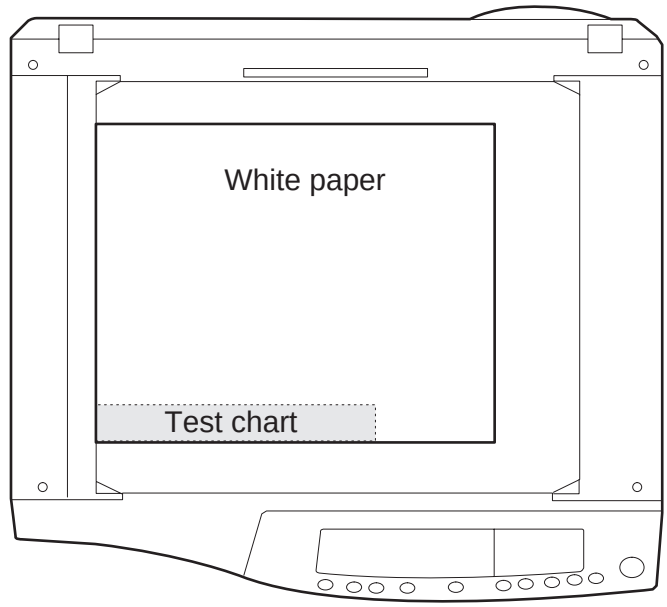
Auto Mode	Brightness 1 step only
Manual Mode	Brightness 5 steps. Adjustment of only the center brightness is made.
Photo Mode	Brightness 5 steps. Adjustment of only the center brightness is made.
Manual T/S mode	Brightness 5 steps. Adjustment of only the center brightness is made.
T/S Auto mode	Brightness 1 step only

E. Copy density adjustment procedure

Use SIM 46-01 to set the copy density for each copy mode.
For selection of modes, use the copy mode select key.

(1) Test chart (UKOG-0162FCZZ) setting

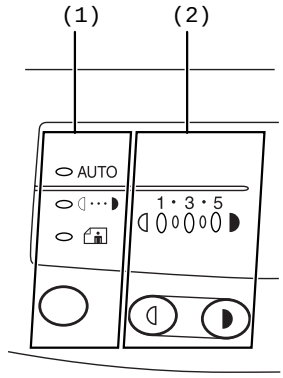
1) Place the test chart so that its edge is aligned with the A4 (Letter) reference line on the document table. Then place a B4 (14″ × 8 1/2″) white paper on the test chart and close the document cover.



(2) Perform the adjustment in each mode.

1) Execute SIM 46-1.

2) Select the mode to be adjusted with the exposure mode select key. Set the exposure level to 3 for all adjustment. (Except for the auto mode.)

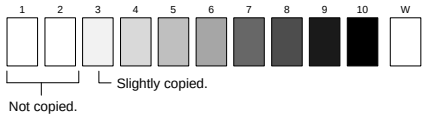
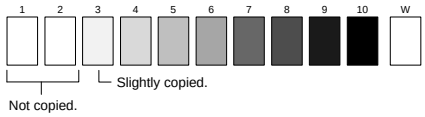


(1) Mode select key/display lamp

(2) Exposure level select key/display lamp

Adjustment mode	Exposure mode display lamp	Exposure level	Sharp gray chart adjustment level
Auto mode	Auto lamp ON	—	“3” is slightly copied.
Manual mode	Manual lamp ON	3	“3” is slightly copied.
Photo mode	Photo lamp ON	3	“3” is slightly copied.
Manual T/S mode	Manual lamp/Photo lamp ON	3	“4” is slightly copied.
Auto T/S mode	Auto lamp/Photo lamp ON	3	“4” is slightly copied.

3) Make a copy.
Check the adjustment level (shown in the above table) of the exposure test chart (Sharp Gray Scale).

	Sharp Gray Scale adjustment level
Non toner save mode	
Toner save mode	

(When too bright): Decrease the value displayed on the copy quantity display.
(When too dark): Increase the value displayed on the copy quantity display.
* The value can be set in the range of 1 — 99.

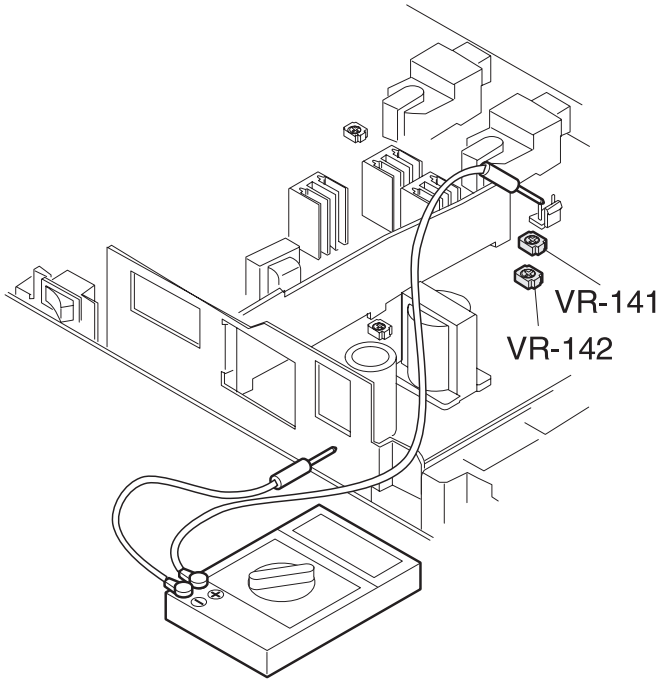
3. High voltage adjustment

A. Main charger (Grid bias)

Note:
- Use a digital multi meter with internal resistance of 10MΩ or more measurement.
- After adjusting the grid LOW output, adjust the HIGH output. Do not reverse the sequence.

Procedures

1. Set the digital multi meter range to DC700V.
2. Set the positive side of the test rod to the connector CN11-3 (GRID) of high voltage section of the power PWB and set the negative side to the frame ground (radiating plate).
3. Execute SIM 8-3. (The main charger output is supplied for 30 sec in the grid voltage LOW output mode.)
4. Adjust the control volume (VR-141) so that the output voltage is –400 ±20V.
5. Execute SIM 8-2. (The main charger output is supplied for 30 sec in the grid voltage HIGH output mode.)
6. Adjust the control volume (VR-142) so that the output voltage is 580 ±10V.

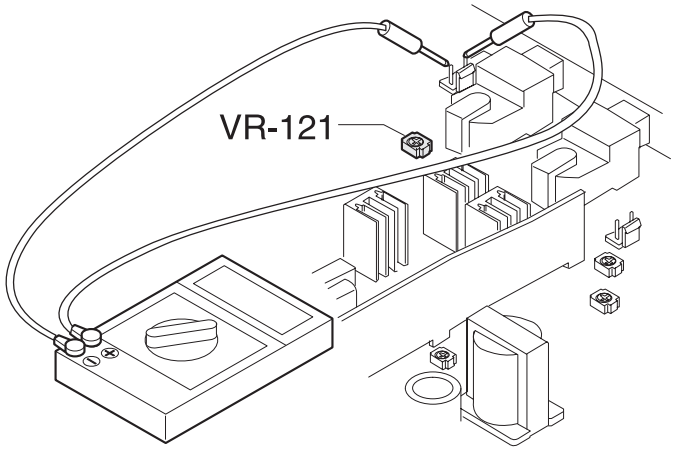


B. DV bias adjustment

Note:
- A digital multi meter with internal resistance of 1GΩ must be used for correct adjustment.

Procedures

1. Set the digital multi meter range to DC500V.
2. Set the positive side of the test rod to the connector CN-10-1 (DV BIAS) and set the negative side to the connector CN10-2 (FG).
3. Execute SIM 8-1. (The developing bias is outputted for 30 sec.)
4. Adjust the control volume (VR-121) so that the output voltage is –400 ±5V.



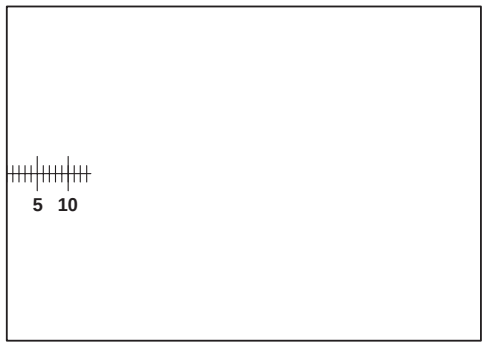
4. Duplex adjustment

A. Adjusting the paper reverse position in memory for duplex copying

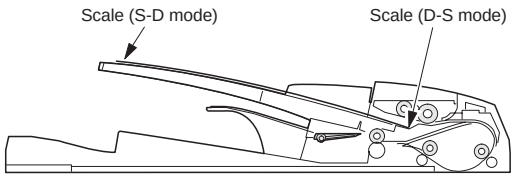
This step adjusts the front surface printing (odd-number pages of a document set) in the S-D mode copying and the leading edge position of an image on even-number pages in the D-S mode.
That is, it covers the adjustment of the second surface printing mode (image loss at the front edge of an image) in which image data is once stored in memory.
The image data is read, starting from its front end in the document delivery direction (Reference direction of document setting in the OC mode)and stored in memory.
This stored image data is printed starting at the printing start position, in the order of last-stored data to the first-stored data.
In other words, the front edge image loss of the image can be adjusted by changing the document read end position.

(Adjustment procedure)

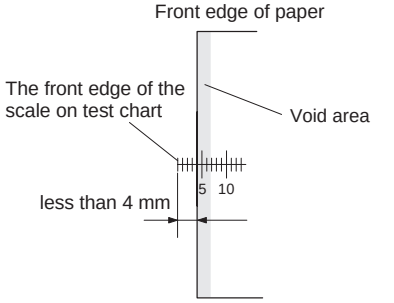
1) Preparing test chart (Draw a scale at the rear end of one side of a sheet of A4 white paper or letter paper)

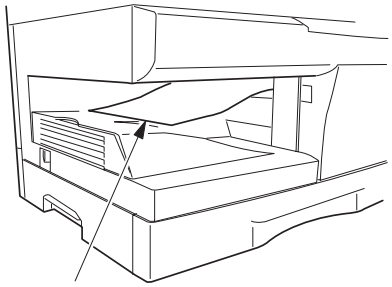


2) Set the test chart so that the scale is positioned as shown below, in the S-D mode and the D-S mode.



3) Execute simulation 50-18 to make a copy and check the front edge image loss at the area where the scale is printed.
Adjust the setting so that the front edge image loss is less than 4.0 mm in the R-SPF mode.
An increase of 1 in setting represents an increase of 0.1 mm in image loss.





2nd printing surface where scale is printed (lower side)

B. Adjusting trailing edge void in duplex copy mode

This is the adjustment of the first surface printing mode (rear end void) in duplex copying.
In a duplex copying operation, the paper is delivered starting from the rear end of the first printing surface. It is therefore necessary to make a void area at the rear end on the first printing surface to prevent paper jam at the fusing part.
There are two adjustment modes:

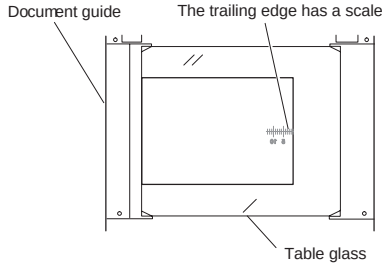
1) Image cut rear end void quantity (R-SPF) 50-19(AE)
The size (length) of a document read from the R-SPF is detected, the image at the trailing edge of the first printing surface is cut to make a void area. (The adjustment of void quantity at the time when the cassette paper size is not recognized.)
2) Paper trailing edge void quantity 50-19 (TEXT)
This adjustment is made when the cassette paper size is recognized. The trailing edge void quantity can be adjusted by changing the trailing edge image laser OFF timing.

The paper void quantity should be first adjusted before the image cut trailing edge void quantity (R-SPF) is adjusted.

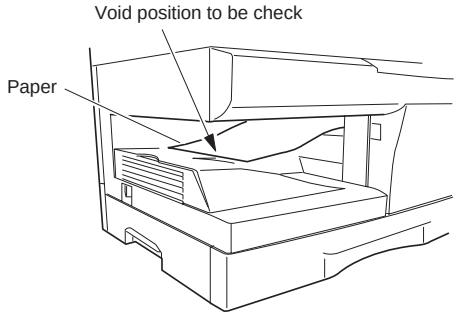
(Adjustment procedure)

(1) Paper trailing edge void quantity

1) Preparing test chart (Draw a scale at the rear end of one side of a sheet of A/4 white paper or letter paper)
2) Set the test chart on the document glass as shown below.



3) Using the user simulation [18], set the paper size of the first cassette.
Letter paper: 4
A4 paper: 3
4) Execute simulation 50-19 to turn on the TEXT lamp and make the printing mode in OC-D mode.
Make a copy of the test chart to check the void area of the scale on the image.

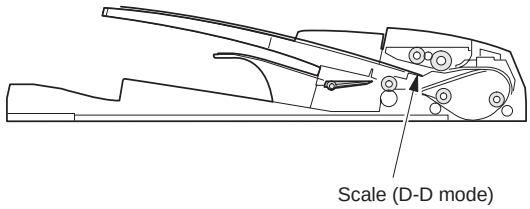


The trailing edge void on the first printing surface is shown above.

Adjust the setting so that the void area is 4 - 5 mm.
An increase in 1 of setting represents 0.1 mm in void area.

(2) Image cut trailing edge void quantity (R-SPF)

1) Set the test chart so that the scale is positioned as shown below.

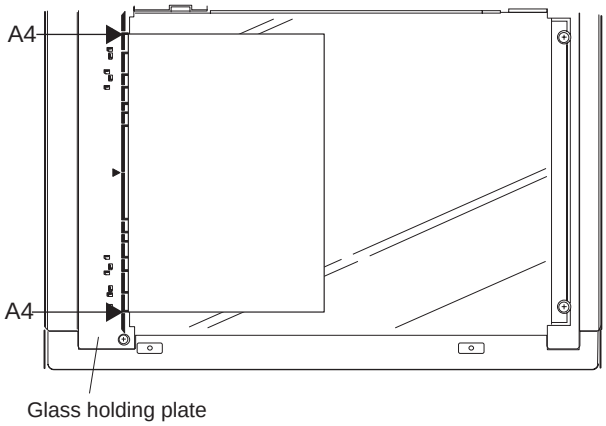


2) Execute simulation 50-19 to turn on the AE lamp and make the printing mode in the D-D mode.
3) Remove and reinsert the cassette.
NOTE: Make sure to carry out this step before making a copy during this adjustment.
4) Make a copy and check the void area of the scale on the image.
Adjust the setting so that the void area is 2 - 4 mm.
An increase of 1 in setting represents an increase of 0.1 mm in void area.

5. Density section

A. FAX mode density adjustment (Overall mode) (<FAX mode> SIM 46-12)

1) Set the test chart (TRAP23109SCZZ <CCITT #3 chart>) on the OC table as shown below, and close the OC cover.



2) Switch to the FAX mode and execute SIM 46-12.
3) After warming up, shading is performed and the current density level is displayed on the lower two digits of the display section in standard and auto density mode.
4) Enter the set value with the 10-key to adjust the FAX image density.
5) Make a copy, and adjust so that the following adjustment specification is satisfied.

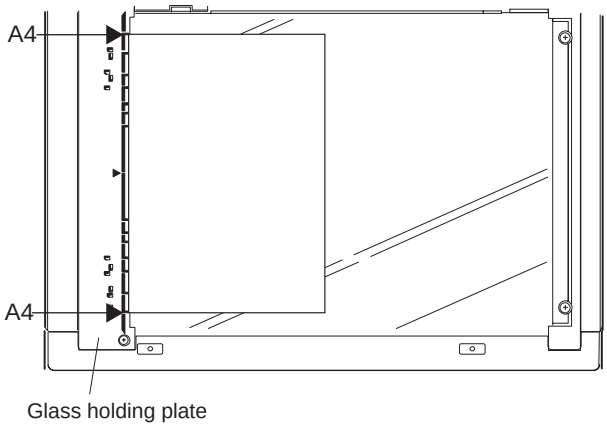
When an adjustment is made in this mode, the exposure level for each communication mode and each density mode are automatically adjusted accordingly.

<Adjustment specifications>

Density mode	Resolution mode	SIM	CCITT #3 chart output result	Set value	Set range
Auto	Standard	FAX mode 46-12	"3" is slightly copied.	The greater the set value is, the greater the density is, and vice versa.	1 – 99

B. FAX mode density adjustment (Individual mode) (<FAX mode> SIM 46-14 – 16)

1) Set the test chart (TRAP23109SCZZ CCITT #3 chart) on the OC table as shown below, and close the OC cover.



2) Switch to the FAX mode and execute SIM 46-14 to 46-16 depending on the adjustment mode.
3) After warming up, shading is performed and the current density level is displayed on the lower two digits of the display section.
4) Enter the set value with the 10-key to adjust the FAX image density.
5) Make a copy, and adjust the density with the copy as a reference.

<Adjustment specifications>

Resolution mode	Density changeover	SIM	Set value	Set range
Fine	Switched with the density select key.	FAX mode 46-14	The greater the set value is, the greater the density is, and vice versa.	1 – 99
Super fine	Switched with the density select key.	FAX mode 46-15		
Ultra fine	Switched with the density select key.	FAX mode 46-16		

6. Communication section

Note: These items are factory adjusted when shipping according to FCC standards. Therefore, do not change the setting in the market.

A. Dial test (<FAX mode> SIM 66-13)

(1) Dial pulse transmission test

1) Execute SIM 66-13 in FAX mode.
2) Execute the dial pulse mode according to the instructions on the LCD display.

```
SELECT  SIGNAL
1:PULSE  2:DTMF
```

3) Set the make time.

```
INPUT  MAKE  TIME
(0–15)              _
```

4) Select the dial to be transmitted.
Default: 0123456789#
(After deleting with the clear key, it can be set to any desired value.)
5) Transmission is started from the line.

```
SEND  yyPPS  xxm  s
1:YES 2:NO
```

```
SENDING  yyPPS  xxm  s
```

		SIM	Soft SW	Initial value	Set value	
Dial pulse make time	10 PPS	FAX mode 66-13	SW67-1 – 4	40ms (14)	SW set value: 0 – 15 Make time: 25 – 41ms	1ms step (Binary input)

(2) DTMF signal transmission level adjustment

1) Execute SIM 66-13 in the FAX mode.
2) Execute the DTMF mode according to the instructions on the LCD display.

```
SELECT  SIGNAL
1:PULSE  2:DTMF
```

3) Select the signal transmission level.
The signal transmission level is classified into two groups: the high group, and the low group.
Transmission can be made with either of default and the soft SW set value.

```
SELECT  HIGH  LEVEL
1:DEFAULT 2:SOFT  SW.
```

```
SELECT  LOW  LEVEL
1:DEFAULT 2:SOFT  SW.
```

4) The transmission level can be set when the following menu is displayed on the LCD. (et value 1 = 0.5dB change)

```
INPUT  VALUE
(0–15)              _
```

(This value is returned to the original value when the simulation mode is canceled.)

5) Select the dial signal to be transmitted.
Default: 0123456789#
(After deleting with the clear key, it can be set to any desired value.)

6) Start transmission from the line.

```
H:xx   L:yy
1:YES 2:NO
```

```
SENDING  DTMF
```

xx: High group soft SW set value
yy: Low group soft SW set value

		SIM	Soft SW	Initial value	Set value	
DTMF trans-mission level	High group	(FAX mode) 66-13 (Test only)	SW53-1 – 4	3.5dB (7)	SW set value: 0 – 15 Transmis-sion level: 0 – 7.5db	0.5ms step (Binary input)
	Low group		SW53-5 – 8	3.5dB (7)		

[9] SIMULATION, FAX SOFTWARE SWITCH, TROUBLE CODES

1. List of simulations

The simulations for the AR-F152 (with Fax functions) are shown in bold fonts.

Sim No.	Kind of main code	Sub code	Operation
01	Optical system	01	Mirror scan operation
02	SPF Individual load operation	**02** 03 04 05 06 07	**SPF sensor status display** Motor ON Paper feed solenoid ON Pressure release solenoid ON (RSPF) Resist clutch ON (RSPF) Gate solenoid ON (RSPF)
05	Lamp ON check	**01** 02 03	**Operation panel display check** Fusing lamp ON + Cooling fan HIGH/LOW speed Copy lamp ON
06	Machine individual load operation	01 02	Paper feed solenoid ON Resist solenoid ON
07	Aging	01 06	Warm up display and aging with jam Intermittent aging
08	High voltage output check	01 02 03 06	Developing bias Main charger (Grid high) Grid voltage (Low) Transfer charger
10	Other	None	Toner motor aging
14	Trouble reset	None	Cancel troubles other than U2
16	U2 trouble reset	None	Cancel of U2 trouble
20	Maintenance counter clear	01	Maintenance/mini-maintenance counter clear
21	Counter setup (When maintenance)	01 02	Maintenance cycle setup Mini-maintenance cycle setup
22	Counter display	01 02 04 05 06 08 12 14 17 18 **20** 21 22 **23** **24**	Maintenance/mini-maintenance counter display Maintenance/mini-maintenance preset display Jam total counter display Total counter display Developer counter display SPF counter display Drum counter display P-ROM version display Copy counter display Printer counter display **FAX print counter display** Scanner counter display SPF jam total counter display **FAX reception counter display** **FAX transmission counter display**
24	Special counter clear	01 04 06 07 08 09 **10** **11** 13 14	Jam total counter clear SPF counter clear Developer counter clear Drum counter clear Copy counter clear Printer counter clear **FAX transmission/reception counter clear** **FAX print counter clear** Scanner counter clear SPF jam total counter clear
25	Main motor ON	01 10	Main motor system ON + Cooling fan low speed (For the duplex model, the duplex motor is simultaneously turned on.) Polygon motor ON
26	Various setup	01 02 03 04 06 07 20 30 37 39 40 42 43 44 47 55	Manual feed setup SPF setup Second cassette setup Machine duplex setup Destination setup Machine conditions check Rear edge void setup CE mark conformity control ON/OFF setup Cancel of stop at developer over Memory capacity setup Polygon motor OFF time setup Transfer ON timing control setup Side void setup SPF document rear edge read setup FAX document rear edge scan setup CRUM destination display
30	Sensor operation check (Standard provision)	01	Paper sensor status display
43	Fusing temperature setup	01 04 05 09	Normal copy Fusing temperature setup 2 Duplex mode fusing temperature setup Postcard size paper fusing control setup
46	Exposure adjustment	01 **12** **13** **14** **15** **19**	Copy density adjustment **FAX density overall adjustment** **FAX density adjustment (Standard mode)** **FAX density adjustment (Fine character mode)** **FAX density adjustment (Super Fine mode)** **γ Table adjustment (Copy mode)**
48	Magnification ratio correction	01	Front/rear scan direction
50	Lead edge adjustment	01 10 18 19	Lead edge image position adjustment Paper lead edge/rear edge void adjustment Paper center offset + OC/Document center offset + SPF document center offset Memory reverse position adjustment Duplex copy rear edge void adjustment
51	Timing adjustment	02 06	Resist quantity adjustment SPF exposure correction
61	Laser system operation	03	Polygon motor check (HSYNC output check)
63	Shading	01	Shading check
64	Self print	01	Self print only with the engine (1 by 2 mode)
66	**FAX PWB check**	**None**	**Simulation on the FAX panel (For details, refer to the FAX simulation.)**
67	Program Download	14	PCL PWB program download

2. Contents of simulations (new or revised simulations only)

Input method: Clear key → Exposure Select key → Clear key → Exposure Select key

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>01</td><td>01</td><td>Mirror scan operation
(Operation/Procedure)
1. When this simulation is executed, the mirror home position is detected.
<table>
<tr><th>Sensor name</th><th>Display lamp</th></tr>
<tr><td>Mirror home position sensor</td><td>OPC drum cartridge replacement lamp</td></tr>
</table>
2. When the _START key is pressed, scanning is executed at the speed corresponding to the currently set copy magnification ratio.
The copy magnification ratio can be arbitrarily set with the magnification ratio select key/zoom key.</td></tr>
<tr><td rowspan="7">02</td><td>02</td><td>SPF sensor status display
ON/OFF of the sensors in the SPF can be checked with the following lamps.
<table>
<tr><th>Display</th><th>Sensor</th></tr>
<tr><td>Toner cartridge replacement lamp</td><td>Document set detection (SPID)</td></tr>
<tr><td>Jam lamp</td><td>SPF document transport detection (SPPD)</td></tr>
<tr><td>Developer replacement lamp</td><td>SPF cover open detection (SCOD)</td></tr>
<tr><td>SPF jam lamp</td><td>SPF open/close detection (SDSW)
FAX document size detection
Paper size detection</td></tr>
<tr><td>SPF lamp</td><td>FAX/SPF B4 size detection (SB4D)</td></tr>
</table></td></tr>
<tr><td>03</td><td>Motor ON
(Operation/Procedure)
When the start key is pressed, the SPF motor rotates for 10 sec at the speed corresponding to the currently set magnification ratio.</td></tr>
<tr><td>04</td><td>Paper feed solenoid ON
(Operation/Procedure)
When the start key is pressed, the SPF paper feed solenoid repeats ON (500 ms) and OFF (500 ms) 20 times.</td></tr>
<tr><td>05</td><td>Pressure release solenoid ON (RSPF)
(Operation/Procedure)
When the start key is pressed, the RSPF document transport solenoid (SPFS) repeats ON (500 ms) and OFF (500 ms) 20 times.</td></tr>
<tr><td>06</td><td>Resist clutch ON (RSPF)
(Operation/Procedure)
When the start key is pressed, the RSPF resist clutch (SRRC) repeats ON (500 ms) and OFF (500 ms) 20 times.</td></tr>
<tr><td>07</td><td>Gate solenoid ON (RSPF)
(Operation/Procedure)
When the start key is pressed, the RSPF gate solenoid (SGS) repeats ON (500 ms) and OFF (500 ms) 20 times.</td></tr>
<tr><td rowspan="3">05</td><td>01</td><td>Operation panel display check
When the PRINT switch is pressed, the LED on the operation panel is lighted for 5 sec. The LED on the FAX panel and the LCD black background are displayed simultaneously.</td></tr>
<tr><td>02</td><td>Fusing lamp ON + cooling fan HIGH/LOW speed
(Operation/Procedure)
When the START key is pressed, the fusing lamp repeats ON (500ms) and OFF (500msec) 5 times.
During this period, the cooling fan rotates in the high speed mode. After completion of the operation, the cooling fan rotates in the low speed mode.</td></tr>
<tr><td>03</td><td>Copy lamp ON
(Operation/Procedure)
When the START key is pressed, the copy lamp is lighted for 5 sec.</td></tr>
<tr><td rowspan="2">06</td><td>01</td><td>Paper feed solenoid ON
(Operation/Procedure)
When the START key is pressed, the paper feed solenoid selected by the tray select key repeats ON (500ms) and OFF (500ms) 20 times.</td></tr>
<tr><td>02</td><td>Resist solenoid ON
(Operation/Procedure)
When the START key is pressed, the resist solenoid (RRS) repeats ON (500ms) and OFF (500ms) 20 times.</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>07</td><td>01</td><td>Warm-up display and aging with jam
(Operation/Procedure)
1. When the simulation is executed, warming up is started.
2. Warm-up time is counted and displayed every second on the copy quantity display.
3. After completion of warm-up, the time count is stopped and the ready lamp is lighted.
4. Press the clear key to clear the warm-up time display, set the copy quantity, and press the START key, and the machine will copy the set quantity repeatedly.</td></tr>
<tr><td></td><td>06</td><td>Intermittent aging
(Operation/Procedure)
1. When the simulation is executed, warming up is started.
2. After completion of warm-up, the ready lamp is lighted.
3. Set the copy quantity and press the START key, and the machine will copy the set quantity repeatedly.
4. After 3 sec of the interval time from completion of copying the set quantity, the machine will resume copying.
5. The above operation 4 is repeated.</td></tr>
<tr><td>08</td><td>01</td><td>Developing bias
(Operation/Procedure)
When the START key is pressed, the developing bias is outputted for 30 sec.</td></tr>
<tr><td></td><td>02</td><td>Main charger (Grid high)
(Operation/Procedure)
When the START key is pressed, the main charger output is supplied for 30 sec in the grid voltage HIGH mode.</td></tr>
<tr><td></td><td>03</td><td>Grid voltage (Low)
(Operation/Procedure)
When the START key is pressed, the main charger output is supplied for 30 sec in the grid voltage LOW mode.</td></tr>
<tr><td></td><td>06</td><td>Transfer charger
(Operation/Procedure)
When the START key is pressed, the transfer charger output is supplied for 30 sec.</td></tr>
<tr><td>10</td><td>None</td><td>Toner motor aging
(Operation/Procedure)
When the START key is pressed, the toner motor output is supplied for 30 sec.</td></tr>
<tr><td>14</td><td>None</td><td>Cancel of troubles other than U2
(Operation/Procedure)
After canceling the trouble, the simulation is also automatically canceled.</td></tr>
<tr><td>16</td><td>None</td><td>Cancel of U2 trouble
(Operation/Procedure)
1. When the START key is pressed, the EEPROM total counter check sum is rewritten and the trouble is canceled.
2. After canceling the trouble, the simulation is also automatically canceled.</td></tr>
<tr><td>20</td><td>01</td><td>Maintenance/mini-maintenance counter clear
When the Print switch is pressed, the maintenance counter is cleared, and 000000 is displayed. When the destination has been set to Japan AB series, the mini-maintenance counter is cleared.</td></tr>
<tr><td>21</td><td>01</td><td>Maintenance cycle setup
The currently set maintenance cycle code is displayed (initial display), and the set data is stored.
<table>
<tr><th>Code</th><th>Setup</th></tr>
<tr><td>0</td><td>3,000 sheets</td></tr>
<tr><td>1</td><td>6,000 sheets</td></tr>
<tr><td>2</td><td>9,000 sheets</td></tr>
<tr><td>3</td><td>13,000 sheets</td></tr>
<tr><td>4</td><td>25,000 sheets</td></tr>
<tr><td>5</td><td>Free (999,999 sheets) ∗ Default</td></tr>
</table></td></tr>
<tr><td></td><td>02</td><td>Mini-maintenance cycle setup (Valid only when the destination is set to Japan AB series.)
The current set code of maintenance cycle is displayed (Initial display), and the set data is stored.
<table>
<tr><th>Code</th><th>Setup</th></tr>
<tr><td>0</td><td>5,000 sheets ∗ Default</td></tr>
<tr><td>1</td><td>10,000 sheets</td></tr>
<tr><td>2</td><td>Free (999,999 sheets)</td></tr>
</table></td></tr>
</table>

Main code	Sub code	Content
22	01	Maintenance/mini-maintenance counter display The display is the same as the total counter value display. When the destination is set to other than Japan AB series, the maintenance counter is displayed. When the destination is set to Japan AB series, the mini-maintenance counter is displayed. The display is the same as the total counter value display.
	02	Maintenance/mini-maintenance preset display The preset value corresponding to the code set in 21-01 and 21-02. The display is the same as the total counter value display. When the destination is set to other than Japan AB series, the maintenance preset value is displayed. When the destination is set to Japan AB series, the mini-maintenance preset value is displayed.
	04	Jam total counter display The display method is the same as the total count value display.
	05	Total counter display The total count value is dispalyed in 3 digits × 2 times repeatedly. <Display example: 12345> 012 → Blank → 345 → Blank → 012 0.7s 0.3s 0.7s 1.0s 0.7s
	06	Developer counter display The display method is the same as the total count value display.
	08	SPF counter display The display method is the same as the total count value display.
	12	Drum counter display The display method is the same as the total count value display.
	14	P-ROM versiondisplay The P-ROM version is displayed in 3 digits on the value display section. (AR, DM, PCL models: 100% Zoom lamp display)
	17	Copy counter display The display method is the same as the total count value display.
	18	Printer counter display The display method is the same as the total count value display.
	20	Fax print counter display The display method is the same as the total count value display.
	21	Scanner counter display The display method is the same as the total count value display.
	22	SPF jam total counter display The display method is the same as the total count value display.
	23	FAX reception counter display The display method is the same as the total count value display.
	24	FAX transmission counter display The display method is the same as the total count value display.
24	01	Jam total counter clear When the PRINT switch is pressed, the jam total count value is reset to 0.
	04	SPF counter clear When the PRINT switch is pressed, the SPF count value is reset to 0.
	06	Developer counter clear When the PRINT switch is pressed, the drum count value is reset to 0.
	07	Drum counter clear When the PRINT switch is pressed, the drum count value is reset to 0.
	08	Copy counter clear When the PRINT switch is pressed, the copy count value is reset to 0.
	09	Printer counter clear When the PRINT switch is pressed, the printer count value is reset to 0.
	10	FAX transmission/reception counter clear When the PRINT switch is pressed, the FAX transmission/reception count value is reset to 0.
	11	FAX print counter clear When the PRINT switch is pressed, the Fax print-out count value is reset to 0.
	13	Scanner counter clear When the PRINT switch is pressed, the scanner count value is reset to 0.

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>24</td><td>14</td><td>SPF jam total counter clear
When the PRINT switch is pressed, the SPF jam total count value is reset to 0.</td></tr>
<tr><td>25</td><td>01</td><td>Main motor system ON + Cooling fan low speed (For the duplex model, the duplex motor is simultaneously turned on.)
(Operation/Procedure)
When the START key is pressed, the main motor is rotated for 30 sec.
To save toner consumption, the different operations are executed depending on installation of the developing unit.
· When the developing unit is installed, the developing bias, the main charger, and the grid are also outputted.
· When the developing unit is not installed, only the motor is rotated.
* Do not turn on the door open/close switch forcibly to execute this simulation.</td></tr>
<tr><td></td><td>10</td><td>Polygon motor ON
(Operation/Procedure)
When the START key is pressed, the polygon motor is operated for 30sec.</td></tr>
<tr><td>26</td><td>01</td><td>Manual feed setup
(Operation/Procedure)
1. When this simulation is executed, the currently set bypass code number is displayed.
2. Enter the code number corresponding to the bypass and press the START key, and the setting will be changed.
<table>
<tr><th>Code number</th><th>Bypass</th></tr>
<tr><td>0</td><td>Single bypass</td></tr>
<tr><td>1</td><td>Multi bypass</td></tr>
</table></td></tr>
<tr><td></td><td>02</td><td>SPF setup
When this simulation is executed, the currently set SPF code number is displayed. Enter the code number of the SPF to be set and press the PRINT switch. The setup is changed.
<table>
<tr><th>Code No.</th><th>SPF</th></tr>
<tr><td>0</td><td>Without SPF</td></tr>
<tr><td>1</td><td>With SPF (Setup is required when installing FAX.)</td></tr>
<tr><td>2</td><td>With RSPF</td></tr>
</table></td></tr>
<tr><td></td><td>03</td><td>Second cassette setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of the second cassette is displayed.
2. Enter the code number and press the start key. The setting is changed.
<table>
<tr><th>Code number</th><th>Second cassette</th></tr>
<tr><td>0</td><td>Without second cassette</td></tr>
<tr><td>1</td><td>With second cassette</td></tr>
</table></td></tr>
<tr><td></td><td>04</td><td>Machine duplex setup
(Operation/procedure)
1. When this simulation is executed, the currently set duplex code number is displayed.
2. Enter the code number corresponding to the duplex and press the ENTER key, and the setup will be changed.
<table>
<tr><th>Code number</th><th>Duplex</th></tr>
<tr><td>0</td><td>Without Duplex</td></tr>
<tr><td>1</td><td>With Duplex</td></tr>
</table></td></tr>
<tr><td></td><td>06</td><td>Destination setup
(Operation/Procedure)
1. When this simulation is executed, the currently set destination code number is displayed.
2. Enter the code number corresponding to the destination and press the START key, and the setting will be changed.
<table>
<tr><th>Code number</th><th>Destination</th></tr>
<tr><td>0</td><td>Inch series</td></tr>
<tr><td>1</td><td>EX AB series</td></tr>
<tr><td>2</td><td>Japan AB series</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>26</td><td>07</td><td>Machine conditions check
(Operation/Procedure)
When this simulation is executed, the current machine setting is displayed.
<table><tr><th>CPM</th><th>Copy quantity display</th></tr><tr><td>10 cpm</td><td>10</td></tr><tr><td>12 cpm</td><td>12</td></tr><tr><td>15 cpm</td><td>15</td></tr></table>(The machine type is shown with the lamp display.
No setup: None
BTA-A: AE mode lamp ON
BTA-B: TEXT mode lamp ON
BTA-C: Photo mode lamp ON)</td></tr>
<tr><td></td><td>20</td><td>Rear edge void setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of rear edge void setting is displayed.
2. Enter the code number of rear edge void setting and press the START key, and the setting will be changed.
<table><tr><th>Code number</th><th>Rear edge void setting</th></tr><tr><td>0</td><td>Rear edge void allowed</td></tr><tr><td>1</td><td>Rear edge void not allowed</td></tr></table></td></tr>
<tr><td></td><td>30</td><td>CE mark conformity control ON/OFF setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of CE mark application is displayed.
2. Enter the code number of CE mark application and press the START key, and the setting will be changed.
<table><tr><th>Code number</th><th>CE mark application setting</th></tr><tr><td>0</td><td>CE mark application control OFF</td></tr><tr><td>1</td><td>CE mark application control ON</td></tr></table></td></tr>
<tr><td></td><td>37</td><td>Cancel of stop at developer life over
When this simulation is executed, the current set code is displayed. Enter a new code and press the PRINT switch, and the entered code is registered.
<table><tr><th>Code number</th><th>Setting</th></tr><tr><td>0</td><td>Stop at developer life over</td></tr><tr><td>1</td><td>Stop cancel at developer life over</td></tr></table></td></tr>
<tr><td></td><td>39</td><td>Memory capacity setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed.
<table><tr><th>Code number</th><th>Setting</th></tr><tr><td>0</td><td>No memory</td></tr><tr><td>1</td><td>4 Mbyte</td></tr><tr><td>2</td><td>6 Mbyte</td></tr></table></td></tr>
<tr><td></td><td>40</td><td>Polygon motor OFF time setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed.
<table><tr><th>Code number</th><th>Setting</th></tr><tr><td>0</td><td>0 sec</td></tr><tr><td>1</td><td>30 sec</td></tr><tr><td>2</td><td>60 sec</td></tr><tr><td>3</td><td>90 sec</td></tr></table></td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>26</td><td>42</td><td>Transfer ON timing control setup
(Operation / Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed. (For any number different from the following ones, the default time is automatically set.)
<table>
<tr><th>Code number</th><th>Setting</th></tr>
<tr><td>0</td><td>Default (330 msec)</td></tr>
<tr><td>1</td><td>–40 msec</td></tr>
<tr><td>2</td><td>–30 msec</td></tr>
<tr><td>3</td><td>–20 msec</td></tr>
<tr><td>4</td><td>–10 msec</td></tr>
<tr><td>5</td><td>Default (330 msec)</td></tr>
<tr><td>6</td><td>+10 msec</td></tr>
<tr><td>7</td><td>+20 msec</td></tr>
<tr><td>8</td><td>+30 msec</td></tr>
<tr><td>9</td><td>+40 msec</td></tr>
</table></td></tr>
<tr><td></td><td>43</td><td>Side void setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of the side void amount is displayed.
2. Enter the code number and press the start key. The setting is changed.
<table>
<tr><th>Code number</th><th>Setting</th></tr>
<tr><td>0</td><td>0 mm</td></tr>
<tr><td>1</td><td>0.5 mm</td></tr>
<tr><td>2</td><td>1.0 mm</td></tr>
<tr><td>3</td><td>1.5 mm</td></tr>
<tr><td>4</td><td>2.0 mm *Default</td></tr>
<tr><td>5</td><td>2.5 mm</td></tr>
<tr><td>6</td><td>3.0 mm</td></tr>
<tr><td>7</td><td>3.5 mm</td></tr>
<tr><td>8</td><td>4.0 mm</td></tr>
<tr><td>9</td><td>4.5 mm</td></tr>
<tr><td>10</td><td>5.0 mm</td></tr>
</table></td></tr>
<tr><td></td><td>44</td><td>SPF document rear edge read setup + Fax document rear edge scan setup.

When this simulation is executed, the currently set code number is displayed. Enter the desired code number and press the START key, and the display will be changed. The document rear edge scanning area in SPF reduction (less than 100%) copy is changed.

The code number is changeable in the range of 0 – 8.
The default value is 4, and 2 mm of the document rear edge is cut.
When the value is changed by 1, the area is changed by 1 mm.</td></tr>
<tr><td></td><td>47</td><td>FAX document rear edge scan setup
When this simulation is executed, the currently set code number is displayed. Enter the desired code number and press the print switch, and the setup is switched. The scan area at the rear edge of FAX original with SPF is changed according to the entered code number.
Code number is in the range of 0 – 8.
The default is 4. When set to the default, the area of about 2 mm from the rear edge of the original is cut out.
When the value is changed by 1, the dimension is changed by about 1 mm.</td></tr>
<tr><td></td><td>55</td><td>CRUM destination display
When this simulation is executed, the current setup of the CRUM destination stored in the machine is displayed.
<table>
<tr><th>Code number</th><th>Setting</th></tr>
<tr><td>00</td><td>No setup</td></tr>
<tr><td>01</td><td>BTA-A</td></tr>
<tr><td>02</td><td>BTA-B</td></tr>
<tr><td>03</td><td>BTA-C</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>30</td><td>01</td><td>Paper sensor status display
The paper sensor status is displayed with the lamps on the operation panel.

<table>
<tr><th>Display</th><th>Sensor</th></tr>
<tr><td>Toner cartridge replacement lamp</td><td>Paper detection before resist (PPD1)</td></tr>
<tr><td>JAM lamp</td><td>Fusing section paper detection (PPD2)</td></tr>
<tr><td>Developer cartridge replacement lamp</td><td>Paper exit paper detection (POD)</td></tr>
<tr><td>2nd cassette lamp</td><td>2nd CS paper detection (PPD3)</td></tr>
<tr><td>AE lamp</td><td>Single manual feed paper detection (MFD)</td></tr>
<tr><td>Exposure level 1 (Light) lamp</td><td>Main cassette A4 width detection (PSW1)</td></tr>
<tr><td>Exposure level 5 (Dark) lamp</td><td>2nd cassette A4 width detection (PSW2)</td></tr>
</table></td></tr>
<tr><td rowspan="4">43</td><td>01</td><td>Fusing temperature setup (Normal copy)
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed.

<table>
<tr><th>Code number</th><th>Set temperature (˚C)</th></tr>
<tr><td>0</td><td>175</td></tr>
<tr><td>1</td><td>180</td></tr>
<tr><td>2</td><td>185</td></tr>
<tr><td>3</td><td>190</td></tr>
<tr><td>4</td><td>195 (∗ Default)</td></tr>
<tr><td>5</td><td>200</td></tr>
</table></td></tr>
<tr><td>04</td><td>Fusing temperature setup 2
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed.

<table>
<tr><th>Code number</th><th>Set temperature (˚C)</th></tr>
<tr><td>0</td><td>155</td></tr>
<tr><td>1</td><td>160</td></tr>
<tr><td>2</td><td>165</td></tr>
<tr><td>3</td><td>170 (∗ Default)</td></tr>
<tr><td>4</td><td>175</td></tr>
<tr><td>5</td><td>180</td></tr>
</table></td></tr>
<tr><td>05</td><td>Duplex mode fusing temperature setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number corresponding to the duplex and press the START key. The setting is changed accordingly.

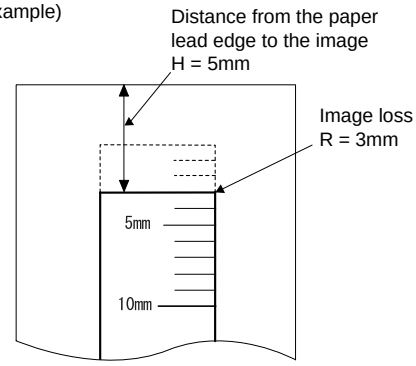
<table>
<tr><th>Code number</th><th>Shift temperature (˚C)</th></tr>
<tr><td>0</td><td>±0˚C</td></tr>
<tr><td>1</td><td>–8˚C</td></tr>
<tr><td>2</td><td>–6˚C</td></tr>
<tr><td>3</td><td>–4˚C</td></tr>
<tr><td>4</td><td>–2˚C</td></tr>
<tr><td>5</td><td>±0˚C</td></tr>
<tr><td>6</td><td>+2˚C</td></tr>
<tr><td>7</td><td>+4˚C</td></tr>
<tr><td>8</td><td>+6˚C</td></tr>
<tr><td>9</td><td>+8˚C</td></tr>
</table>
∗ The above shift temperature set by this simulation is added to the fusing temperature of single copy.</td></tr>
<tr><td>09</td><td>Postcard size paper fusing control setup

<table>
<tr><th>Code number</th><th>Setup</th></tr>
<tr><td>0</td><td>Cancel (Default)</td></tr>
<tr><td>1</td><td>Setup</td></tr>
</table></td></tr>
</table>

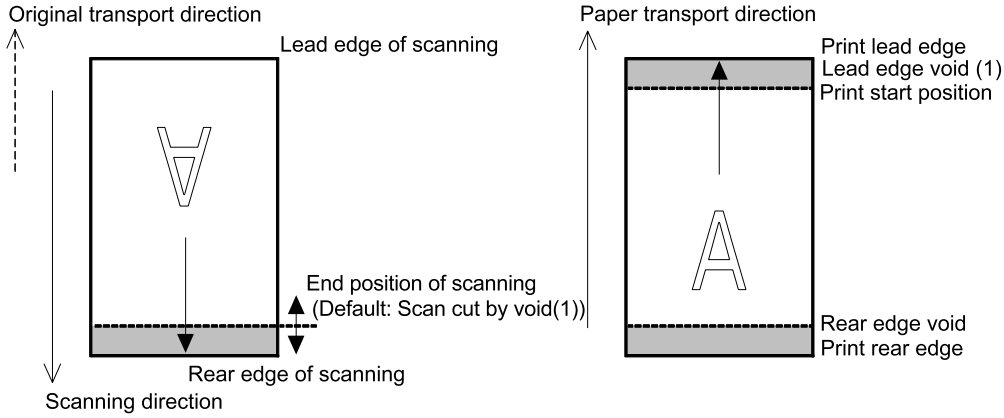
<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>46</td><td>01</td><td>
Copy density adjustment
(Outline)
Used to adjust the copy density in each copy mode.(The copy density can be set by changing the set value of ASIC GAMMA ADJUST register.)
Setting in each copy mode is performed at exposure level 3. When the copy density (exposure) is adjusted arbitrarily, the max, and min. exposure levels are automatically calculated and set. (The change amounts (gradient, change amount) at level 1 – 5 are predetermined.)
(Operation/Procedure)
1. When this simulation is executed, warming up and shading are performed and the current set value is displayed in two digits.
2. Press the copy mode select key to select each setting mode and setting display.
∗ The copy mode setting is indicated with the following lamps as shown below.
3. Change the setting with the value up-down key and press the START key, and a copy will be made with the entered set value.
4. Press the clear key to store the set value and exit the simulation.
<table>
<tr><th>Copy mode</th><th>Display lamp</th></tr>
<tr><td>AE mode</td><td>AE mode lamp</td></tr>
<tr><td>TEXT mode</td><td>TEXT mode lamp</td></tr>
<tr><td>PHOTO mode</td><td>PHOTO mode lamp</td></tr>
<tr><td>TS mode (TEXT)</td><td>TEXT mode lamp & PHOTO mode lamp</td></tr>
<tr><td>TS mode (AE)</td><td>AE mode lamp & PHOTO mode lamp</td></tr>
</table>
Relationship between the displayed values and the GAMMA ADJUST register
<table>
<tr><th></th><th>Exp1</th><th>Exp2</th><th>Exp3</th><th>Exp4</th><th>Exp5</th></tr>
<tr><td>AE</td><td>–24</td><td>–12</td><td>0</td><td>+12</td><td>+24</td></tr>
<tr><td>TEXT</td><td>–24</td><td>–12</td><td>0</td><td>+12</td><td>+24</td></tr>
<tr><td>PHOTO</td><td>–24</td><td>–12</td><td>0</td><td>+12</td><td>+24</td></tr>
<tr><td>T/S</td><td>–24</td><td>–12</td><td>0</td><td>+12</td><td>+24</td></tr>
</table>
The value displayed after execution of this simulation can be set in the range of 0 – 99 with 50 as the center value.
When the text mode set value is Gat3, for example, the GAMMA ADJUST register value set at Exp1 is:
Text Exp1 = Gat3 – 50 – 24
When 40 is set to Gat3, Text Exp1 = 40 – 50 – 24 = –34
Then set the GAMMA ADJUST register set value to –34.
Perform the same procedure for each mode and each Exp.
∗ The above table may subject to change.
∗ For the gradient, there is a similar table, though not specified here. The value set with SIM 46, however, is not reflected.
∗ The AE mode Exp selection is not specified, but corresponds to the grades for AE exposure selection in the former models.
</td></tr>
<tr><td></td><td>12</td><td>
FAX density overall adjustment
Used to set the normal mode density setup value added with each FAX resolution mode correction value to each FAX resolution mode collectively.
(Operating procedure)
When this simulation is executed, warming up and shading are performed and the currently set value is displayed in 2 digits. (Center value: 50)
Change the set value with the value up-down key and press the PRINT switch. The entered value is stored and the simulation is terminated.
During this mode, the resolution mode cannot be selected.

The range of values dispalyed after execution of this simulation is 0 - 99 with 50 as the center.
∗ when reading FAX, the AE density can be selected in three levels (Dark, Normal, Light). However, in this mode, copying is made in Normal. (There is no manual setup in reading FAX.)
</td></tr>
<tr><td></td><td>13</td><td>
FAX density adjustment (Standard mode)
Used to set the density set value in the normal mode individually.
(Operating procedure)
Same as the FAX density overall adjustment.
</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>46</td><td>14</td><td>FAX density adjustment (Fine mode)
Used to set the denisty set value in the small character mode individually.
(Operating procedure)
Same as the FAX density overall adjustment.
Since, however, the small character mode has the Text document mode and the Photo document mode, changeover can be made with the copy mode select key and the set value of the selected mode is displayed on the copy quantity display. The copy mode setup is made as shown below.
<table><tr><th>Mode</th><th>Display lamp</th></tr><tr><td>Text document mode</td><td>AE mode lamp</td></tr><tr><td>Photo document mode</td><td>Photo mode lamp</td></tr></table></td></tr>
<tr><td></td><td>15</td><td>FAX density adjustment (Super Fine mode)
Used to set the density set value in the fine mode individually.
(Operating procedure)
Same as the FAX density overall adjustment.</td></tr>
<tr><td></td><td>19</td><td>γ table setup
When this simulation is executed, the currently set gamma table code number is displayed. Enter the code number corresponding to your desired gamma table and press the PRINT switch, and the setup will be changed.
<table><tr><th>Code number</th><th>γ table</th></tr><tr><td>1</td><td>Japan</td></tr><tr><td>2</td><td>EX Japan</td></tr></table></td></tr>
<tr><td>48</td><td>01</td><td>Front/rear scan direction
(Outline)
(1) Front/rear scanning direction magnification ratio auto correction: (Performed by changing the set value of ZOOM DATA register for asic.) The width of the reference line marked on the shading correction plate is scanned to perform the front/rear direction magnification ratio adjustment automatically. (Performed by changing the set value of ZOOM DATA register for ASIC.)
(2) Front/rear scanning direction magnification ratio manual correction: Used to set the front/rear (main scanning) direction magnification ratio by key operations. (Performed by changing the set value of ZOOM DATA register for ASIC.)
(3) Scanning direction magnification ratio correction: The scanning direction magnification ratio in the OC mode is set by key operations. (Performed by changing the scanning speed.)
(4) SPF mode scanning direction magnification ratio correction: The scanning direction magnification ratio in the OC mode is set by key operations. (Performed by changing the scanning speed.)
(Operation/Procedure)
1. When this simulation is executed, the current set value is displayed in two digits. (Center value: 50)
2. When the copy mode select key is pressed, the setting mode and the setting display are changed sequentially.
∗ The selected adjustment mode is indicated by the lamps as follows:
3. In the front/rear scanning direction adjustment, when the START key is pressed, the mirror base unit moves to the white plate for shading and the width of the reference line is read and the correction value is calculated and displayed and the value is stored.
In the case of the manual adjustment, enter the adjustment value with the 10-key and press the START key. Then the entered value is stored and a copy is made. (An increase of 1 in the set value corresponds to an increase of 0.1mm.)
4. Press the clear key to store the set value and exit the simulation.
<table><tr><th>Adjustment mode</th><th>Lamps ON</th></tr><tr><td>Front/rear direction magnification ratio auto correction</td><td>AE lamp</td></tr><tr><td>Front/rear direction magnification ratio manual correction</td><td>TEXT lamp</td></tr><tr><td>Scanning direction magnification ratio correction</td><td>PHOTO lamp</td></tr><tr><td>SPF mode scanning direction magnification ratio correction</td><td>AE, TEXT, PHOTO lamps</td></tr></table>In the front-rear direction magnification ratio correction:
(1) The result of calculation of the scan correction value is ±5% or less, “- -” is displayed.
(Cause) The white plate reference position error or the lens unit installing error
(2) In case of a scanning error of the reference line, the JAM lamp is turned on.
(Cause) CCD error or no white plate
∗) If the automatic correction of magnification ratio does not work properly, adjust and correct manually.</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>50</td><td>01</td><td>
Lead edge image position adjustment + Paper lead edge/rear edge void adjustment
(Outline)
This adjustment is used to adjust the copy image position and lead edge/rear edge void amount on the copy paper by adjusting the image scan start position and the print start position (resist roller ON timing) at 100%.
(Operation/Procedure)
1. When this simulation is executed, the currently set value is displayed in two digits. (Center value: 50)
2. When the copy mode select key is pressed, each setting mode and the display are changed.
∗ The selected adjustment mode is indicated by the lamps as shown in the table below.
3. Enter the adjustment value with the 10-key and press the start key. The set value is stored and a copy is made. (When the set value is increased by 1, the void amount is shifted by 0.1 mm.)
4. When the clear key is pressed, the set value is stored and the simulation mode is terminated.
<table>
<tr><th>Adjustment mode</th><th>Lighting lamps</th></tr>
<tr><td>Print start position (Main cassette)</td><td>AE, Main cassette lamps</td></tr>
<tr><td>Print start position (2nd cassette)</td><td>AE, 2nd lamps</td></tr>
<tr><td>Print start position (Manual paper feed)</td><td>AE, Manual feed lamps</td></tr>
<tr><td>Image lead edge void quantity</td><td>TEXT lamp</td></tr>
<tr><td>Image scan start position</td><td>PHOTO lamp</td></tr>
<tr><td>Image rear edge void quantity</td><td>AE, TEXT, PHOTO lamps</td></tr>
<tr><td>SPF image scan start position</td><td>AE, TEXT lamps</td></tr>
</table>
(Adjustment method)
1. Set the print start position (A: AE ON), the lead edge void amount (B: TEXT ON), the scanning start position (C: PHOTO ON) to zero and make a copy of a scale at 100%.
2. Measure the image loss R (mm) of the scale.
Set as C = 10 × R (mm). (Example: Set to 30.)
∗ When C is increased by 10, the image loss is decreased by 1 mm. (Default: 5)
3. Measure the distance H (mm) from the paper lead edge to the image print start position.
Set as A = 10 × R (mm). (Example: Set to 50.)
∗ When the value of A is increased by 10, the image lead edge is shifted toward the paper lead edge by 1 mm. (Default: 50)
4. Set the lead edge void amount as B = 50 (2.5 mm). (Default: 50)
∗ When the value of B is increased by 10, the void is increased by about 1 mm.
(For 25 or less, however, the void amount becomes zero.)
(Example)


☆ The SPF adjustment is made by adjusting the SPF image scan start position immediately after turning on the power.
</td></tr>
<tr><td></td><td>10</td><td>
Paper center offset + OC/Document center offset + SPF document center offset
(Outline)
The center offset position of copy image on the copy paper and that of document scan are adjusted by adjusting the scan left margin of ASIC and the print left margin register set value.
(Operation/Procedure)
1. When this simulation is executed, the currently set value is displayed.
2. For a machine with a multi manual paper feed unit installed, when the copy mode select key is pressed, each set mode and display are changed.
For a machine with a single manual paper feed unit installed, when the copy mode select key is pressed, each set mode and display are changed.
☆ Machine with a multi manual paper feed unit
<table>
<tr><th>Adjustment mode</th><th>Display lamp</th></tr>
<tr><td>Print center offset (Main cassette paper feed)</td><td>AE, main cassette lamp</td></tr>
<tr><td>Print center offset (2nd cassette paper feed)</td><td>AE, 2nd cassette lamp</td></tr>
<tr><td>Print center offset (Manual paper feed)</td><td>AE, Manual paper feed lamp</td></tr>
<tr><td>OC/Document center offset</td><td>AE, TEXT lamp</td></tr>
<tr><td>SPF/Document center offset</td><td>AE, TEXT, PHOTO lamp</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>50</td><td>10</td><td>☆ Machine with a single manual paper feed unit
<table>
<tr><th>Adjustment mode</th><th>Display lamp</th></tr>
<tr><td>Print center offset (Main cassette paper feed)</td><td>AE, Main cassette lamp</td></tr>
<tr><td>Print center offset (Manual paper feed)</td><td>AE lamp (Blinking)</td></tr>
<tr><td>OC/Document center offset</td><td>AE, TEXT lamp</td></tr>
<tr><td>SPF/Document center offset</td><td>AE, TEXT, PHOTO lamp</td></tr>
</table></td></tr>
<tr><td></td><td>18</td><td>Memory reverse position adjustment in duplex copy
When this simulation is executed, the currently set correction value is displayed. Enter the desired correction value with the 10-key and press the print key. The entered value is stored. (The correction value ranges from 1 to 99. 0 or 50 for zero correction.)
Front print in the S-D mode and even page print in the D-S mode are performed with reverse memory operation from the rear of the original. When, therefore, the print position adjustment of the output image is required, perform the adjustment as follows:
The image direction in reverse memory copy is shown in Fig. 1. When the original scanning is made in the arrow direction, output images are printed from the rear edge of scanning.
If, therefore, the print lead edge is shifted, set the reference chart so that the reference position is in the rear and use this simulation to change the simulation set value so that the lead edge of print images comes in the proper position.
Printing is started at the print start position and executed from the final memory image data to the head data.
By changing the position of the end data stored in memory with the simulation set value, the image lead edge position is adjusted and the read edge position of scanning is changed.
Therefore, the end position of scanning is changed by the simulation set value to change the position of the end data stored in memory. The image lead edge is adjusted in this manner.
 
</td></tr>
<tr><td></td><td>19</td><td>Duplex copy rear edge void adjustment
Used to adjust the rear edge void in duplex copy.
(Operating procedure)
When this simulation is executed, the currently set value is displayed in 2 digits.
When the copy mode select key is pressed, the set mode and the display are switched sequentially.
Enter the adjustment value with the 10-key and press the print key, and the entered value is stored and a copy is made. When the clear key is pressed, the entered value is stored and the simulation mode is terminated.
(When the set value is increased by 1, the void is increased by about 0.1mm.)
<table>
<tr><td>Adjustment mode</td><td>Lamp ON</td></tr>
<tr><td>Image cut rear edge void (RSPF)</td><td>AE lamp</td></tr>
<tr><td>Paper rear edge void</td><td>TEXT lamp</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>51</td><td>02</td><td>Resist quantity adjustment
Used to adjust the contact pressure of paper onto the copier resist roller and the RSPF resist roller.
(Operation/Procedure)
1. When this simulation is executed, the currently set value is displayed.
2. In a machine with the multi paper feed unit installed, press the copy mode select key, and each setting mode and display are changed sequentially.
In a machine with the single paper feed unit installed, press the copy mode select key, and each setting mode and display are changed sequentially.
∗ The selected adjustment mode is indicated by the lamps as follows:
3. Enter the adjustment value with the 10-key and press the SORT key. Then the set value is stored and a copy is made.
4. Press the clear key to store the set value and exit the simulation.
∗ Machine with the multi manual paper feed
<table>
<tr><th>Adjustment mode</th><th>Display lamp</th></tr>
<tr><td>Main cassette paper feed</td><td>AE, Main cassette lamp</td></tr>
<tr><td>2nd cassette paper feed</td><td>AE, 2nd cassette lamp</td></tr>
<tr><td>Manual paper feed</td><td>AE, Manual paper feed lamp</td></tr>
<tr><td>RSPF document feed (front)</td><td>AE, TEXT, PHOTO lamp</td></tr>
<tr><td>RSPF document feed (back)</td><td>AE, TEXT lamp</td></tr>
<tr><td>Duplex back</td><td>TEXT, PHOTO lamp</td></tr>
</table>
∗ Machine with the single manual paper feed
<table>
<tr><th>Adjustment mode</th><th>Display lamp</th></tr>
<tr><td>Main cassette paper feed</td><td>AE, Main cassette lamp</td></tr>
<tr><td>Manual paper feed</td><td>AE blinking (Main cassette lamp ON)</td></tr>
<tr><td>RSPF document feed (front)</td><td>AE, TEXT, PHOTO lamp</td></tr>
<tr><td>RSPF document feed (back)</td><td>AE, TEXT lamp</td></tr>
<tr><td>Duplex back</td><td>TEXT, PHOTO lamp</td></tr>
</table></td></tr>
<tr><td></td><td>06</td><td>SPF exposure correction
(Outline)
The SPF exposure correction amount is adjusted by adjusting the change in Vref voltage for the OC mode.
(Operation/Procedure)
1. When this simulation is executed, the currently set value is displayed.
2. Enter the adjustment value with the 10-key and press the start key. The entered value is stored and a copy is made.
∗ When the adjustment value is changed by 1, the D/A output is changed by +1 digit (dark) for OC exposure. When it is changed by –1, the output is changed by –1 digit (light).
3. When the clear key is pressed, the entered value is stored and the simulation mode is terminated.</td></tr>
<tr><td>61</td><td>03</td><td>Polygon motor check (HSYNC output check)
(Operation/Procedure)
When the START key is pressed, HSYNC is performed and the polygon motor is rotated for 30 sec.
At that time, the Zoom lamp is lighted for 100msec every time when HSYNC is detected.</td></tr>
<tr><td>63</td><td>01</td><td>Shading check
(Outline)
Used to display the detection level of the white plate for shading. (Vref of AD conversion IC is fixed.)
(Operation/Procedure)
When the START key is pressed, the mirror base unit moves to the white plate for shading and Vref+ voltage of AD conversion IC is set to 4.5V and Vref- voltage to 0.5V, and the copy lamp is lighted.
This state is kept for 10 sec, and the level of one pixel at the center is detected every second to display on the value display section.</td></tr>
<tr><td>64</td><td>1</td><td>Self print only with the engine (1 by 2 mode)
(Outline)
Used to print in the 1 by 2 mode by ignoring the state of the optical system.
(Operation/Procedure)
1. When this simulation is executed, warming up is made and the ready lamp is lighted.
2. Select with the cassette select key and press the start key. Paper is fed from the selected cassette and printing is performed.
In the 1 by 2 mode, one line is printed and two lines are not printed.</td></tr>
</table>

Main code	Sub code	Content
66	None	Simulation on the FAX panel (For details, refer to the FAX simulation.)
67	14	PCL PWB program download Used to download the control program for PCL PWB. (Operating procedure) 1. Download procedure 1) Enter the simulation code, and the Ready LED will light up and the On-line LED will go off. 2) Press the PRINT switch, and the Ready LED will go off and the Flash ROM data will be deleted. 3) After completion of deletion, the On-line LED lights up. 4) Get your PC into the DOS mode and execute "COPY /Bxxx.BIN LPT1", and downloading will be started and the On-line LED will blink. 5) After completion of downloading, execute SUM check. If there is no problem, the On-line LED will go off and the Ready LED will light up. If there is any problem, "F9-10:PCL PWB trouble" is displayed. 6) Turn OFF/ON the power. 2. In case of a fail in downloading, turn OFF/ON the power and perform procedure 1. 3. Items required for Flash downloading 1) PC 2) Parallel cable 3) Program data file

3. FAX simulations (AR-F152 only)

A. Entering the FAX simulation mode

There are following two ways of entering the Fax simulation mode. They differ only in the key sequence and the operations of the simulation are the same in either mode.
For key operations in the FAX simulation mode, use the LCD display and the FAX panel.
During Fax operations, the Fax simulation cannot be entered.

(1) From the FAX panel

	Procedure	Procedure Position	Operation
1	Press FUNCTION, 9, ∗, 8, #, 7.	Fax Panel	ROM version is displayed on the LCD.
2	Press ENTER.	Fax Panel	FAX enters the simulation mode. The machine is in the normal display.
3	Press ← / → proper times.	Fax Panel	Each mode name is displayed on the LCD sequentially.
4	Press ENTER.	Fax Panel	The mode is determined.
5	Procedure in each mode	Fax Panel	Operations in each mode

Instead of above procedures 3 and 4, press the code (2 digits) of the target mode to enter the mode directly.

(2) From the COPIER panel

	Procedure	Procedure Position	Operation
1	Press Clear, Exposure, Clear, Exposure.	Copier Panel	Waiting for simulation code. FAX is in the normal display.
2	Enter the main code of 66 with 10Up/1Up keys.	Copier Panel	“66” is displayed on 7SEG LED.
3	Press START key.	Copier Panel	The machine exits the simulation mode, and the FAX enters the simulation mode.
4	Press ← / → proper times.	Fax Panel	Each mode name is displayed on the LCD sequentially.
5	Press ENTER.	Fax Panel	The mode is determined.
6	Procedure in each mode	Fax Panel	Operations in each mode

Instead of above procedures 4 and 5, press the code number (2 digits) of the target mode to enter the mode directly.

B. List of functions

Mode #	Mode	Details of functions	LCD display (Mode name)
01	Soft switch setting mode	This mode is used to change the soft switch setup. The available soft switches are SW1 to SW30. The contents of soft switches are backed up. For details of soft switches, refer to “Software Switch for FAX.”	01:SOFT SWITCH
02	Soft switch clear mode (Only the setup is cleared.)	This mode is used to reset the soft switch setup (including the user option setup) to the default. Since, however, some of soft switches have the adjustment values, the area for the adjustment values is excluded from the targets.	02:SOFT SW CLEAR

<table>
<tr><td>03</td><td>ROM & RAM check mode</td><td>This mode is used to perform ROM check sum and RAM read/write test.
The result is shown with the buzzer and the LCD.
No error: NO ERROR/ No buzzer
ROM error : ROM ERROR / Buzzer once
RAM error : RAM ERROR / Buzzer twice</td><td>03:ROM/RAM CHECK</td></tr>
<tr><td>04</td><td>Signal send mode</td><td>This mode is used to send various signals to the line. The FAX signal is sent in the level set with the soft switch.
There are the following kinds of signals:
<table>
<tr><td>1</td><td>No signal (OFF HOOK state)</td><td></td></tr>
<tr><td>2</td><td>DTMF</td><td>(0,1,2,3,4,5,6,7,8,9,*,#)</td></tr>
<tr><td>3</td><td>14400 bps (V.17)</td><td>(00000000b, 11111111b, 01010101b)</td></tr>
<tr><td>4</td><td>12000 bps (V.17)</td><td>(00000000b, 11111111b, 01010101b)</td></tr>
<tr><td>5</td><td>9600 bps (V.17)</td><td>(00000000b, 11111111b, 01010101b)</td></tr>
<tr><td>6</td><td>7200 bps (V.17)</td><td>(00000000b, 11111111b, 01010101b)</td></tr>
<tr><td>7</td><td>9600 bps (V.29)</td><td>(00000000b, 11111111b, 01010101b)</td></tr>
<tr><td>8</td><td>7200 bps (V.29)</td><td>(00000000b, 11111111b, 01010101b)</td></tr>
<tr><td>9</td><td>4800 bps (V27ter)</td><td>(00000000b, 11111111b, 01010101b)</td></tr>
<tr><td>10</td><td>2400 bps (V27ter)</td><td>(00000000b, 11111111b, 01010101b)</td></tr>
<tr><td>11</td><td>300 bps (FLAG)</td><td>(00000000b, 11111111b, 01010101b)</td></tr>
<tr><td>12</td><td>2100 Hz (CED)</td><td></td></tr>
<tr><td>13</td><td>1100 Hz (CNG)</td><td></td></tr>
</table></td><td>04:SIGNAL SEND</td></tr>
<tr><td>10</td><td>Image memory clear mode (Only the image data is cleared.)</td><td>This mode is used to clear the image data memory (DRAM).</td><td>10:IMAGE MEM CLEAR</td></tr>
<tr><td>14</td><td>Dial test / adjustment mode (Pulse 10 pps)</td><td>This mode is used to dial in dial pulse (10PPS) and to set the pulse make ratio adjustment value.
The range of make ratio variable range: -8% ~ +7%
The setup is reflected on the adjustment value area of the soft switch.
The dialed number is fixed to “1590.”</td><td>14:DIAL TEST 10 PPS</td></tr>
<tr><td>16</td><td>Dial test mode (Tone)</td><td>This mode is used to dial with DTMF.
The number to be dialed is fixed to “123456789∗0#”.</td><td>16:DIAL TEST TONE</td></tr>
<tr><td>21</td><td>Print out soft switch mode</td><td>This mode is used to print the report on the current soft switch setup.</td><td>21:PRINT SOFT SW</td></tr>
<tr><td>42</td><td>FAX Panel check mode</td><td>This mode is used to check the keys and the LED on the FAX panel.
When any key on the FAX panel other than the STOP key is pressed, the name of the pressed key is displayed on the LCD.
The LED’s on the FAX panel are lighted one by one sequentially.
When any change is made on a sensor in the SPF section, the sensor name as well as its ON/OFF status is displayed on the LCD.</td><td>42:FAX PANEL TEST</td></tr>
<tr><td>43</td><td>Signal detect mode</td><td>This mode is used to detect signals in the line, and the detected signal name is displayed on the LCD. The signals to be detected are CNG, DTMF, and silent.
The detection conditions conform to the soft switch setup.</td><td>43:SIG. DETECT</td></tr>
<tr><td>44</td><td>Long distance comm. Select mode</td><td>This mode is used to specify the other party FAX numbers registered in the one-touch/speed dial, with which communication errors occur frequently due to poor line conditions
To the specified parties, the max. transmission speed is compulsorily reduced to stabilize the communication line.
The speed is available in 9600BPS and 4800BPS.</td><td>44:LONG DIST COMM</td></tr>
</table>

C. Operating procedures in each mode

(1) Soft SW change method

	Procedure	LCD	Operation
1	Press FUNCTION, 9, ∗, 8, #, 7.	DIAGNOSTIC MODE ROM VERSION = <version>	
2	Press ENTER.	DIAGNOSTIC MODE SELECT MENU(← →)	
3	Press 0, 1.	SW # =	
4	Enter the SW No. (2 digits) to be changed.	SW # = 10	
5	Press ← / → to shift the cursor to the bit to be changed. (The left edge is Bit No. 1.)	SW10 = 00010101 bit # = 12345678	

6	Press FUNCTION to highlight the bit in the cursor position.	SW10 = 10010101 bit # = 12345678	
7	Press ENTER to register.	SW # =	Return to Step 3. Press STOP to exit from the mode.

(2) Soft switch clear mode

	Procedure	LCD	Operation
1	Press FUNCTION, 9, ∗, 8, #, 7.	DIAGNOSTIC MODE ROM VERSION = <version>	
2	Press ENTER.	DIAGNOSTIC MODE SELECT MENU(← →)	
3	Press 0, 2.	02:SOFT SW CLEAR 1:OK 2:CANCEL	
4	Press 1.	DIAGNOSTIC MODE SELECT MENU(← →)	The soft switches setup is reset to the default, and this mode is terminated.

(3) ROM & RAM check mode

	Procedure	LCD	Operation
1	Press FUNCTION, 9, ∗, 8, #, 7.	DIAGNOSTIC MODE ROM VERSION = <version>	
2	Press ENTER.	DIAGNOSTIC MODE SELECT MENU(← →)	
3	Press 0, 3.	03:ROM/RAM CHECK	
4	(Normal case)	ROM/RAM OK	
	(RAM error)	RAM ERROR	Two short beeps
	(ROM error)	ROM ERROR	One short beep

(4) Signal send mode

	Procedure	LCD	Operation
1	Press FUNCTION, 9, ∗, 8, #, 7.	DIAGNOSTIC MODE ROM VERSION = <version>	
2	Press ENTER.	DIAGNOSTIC MODE SELECT MENU(← →)	
3	Press 0, 4.	04:SIGNAL SEND SELECT SIGNAL	
4	Press ← or → repeatedly to select the target signal.	<signal type> PRESS ENTER KEY	For <signal type>, refer to TABLE-3.
5	When the target signal is displayed, press ENTER.		mode # = 1 → 10 mode # = 2 → 20 mode # = 3 ~ 6 → 30 mode # = 7 → 40
10		1:NO SIGNAL	The relay is turned ON.
11	Press STOP.	04:SIGNAL SEND SELECT SIGNAL	The relay is turned OFF. “NO SIGNAL” mode is terminated.
12	(To terminate this mode) Press STOP.		This mode is terminated.
20		2:DTMF DTMF # =	
21	Press any NUM key(0 ~ 9) or ∗ or #.	2:DTMF DTMF # = <pressed key>	The DTMF signal corresponding to the pressed key is sent.
22	Press STOP.	2:DTMF DTMF # =	
23	(To continue) Go to 21.		
	(To change the signal kind) Press STOP.	04:SIGNAL SEND SELECT SIGNAL	
	(To terminate this mode) Press STOP twice.		This mode is terminated.

	Procedure	LCD	Operation
30		<signal type> SELECT SPEED	
31	Press ← or → to select the target speed.	<signal speed> PRESS ENTER KEY	For <signal speed>, refer to TABLE-4.
32	When the target speed is displayed, press ENTER.	<signal speed> SELECT DATA	
33	Press ← or → to select the target data to be sent.	<data> PRESS ENTER KEY	For <data>, refer to TABLE-5.
34	When the target data is displayed, press ENTER.	<signal speed> <data>	The selected signal is sent.
35	Press STOP.	<signal speed> SELECT DATA	Signal send stop
36	(To change data only) Go to 33.		
	(To change speed) Press STOP.	<signal type> SELECT SPEED	
	(To change the signal kind) Press STOP twice.	04:SIGNAL SEND SELECT SIGNAL	
	(To terminate this mode) Press STOP 3 times.		This mode is terminated.
40		7:TONE SELECT FREQUENCY	
41	Press ← or → to select the target frequency.	<signal freq.> PRESS ENTER KEY	For <signal freq.>, refer to TABLE-4.
42	When the target frequency is displayed, press ENTER.	<signal freq.>	The selected signal is sent.
43	Press STOP.	7:TONE SELECT FREQUENCY	Signal send stop
44	(To change the frequency only) Go to 41.		
	(To change the signal kind) Press STOP.	04:SIGNAL SEND SELECT SIGNAL	
	(To terminate this mode) Press STOP twice.		This mode is terminated.

TABLE-3: Signals in the Signal send mode

MODE #	MENU	DISPLAY
1	No signal	1:NO SIGNAL
2	DTMF	2:DTMF
3	V.17	3:V.17
4	V.29	4:V.29
5	V27ter	5:V27ter
6	FLAG	6:FLAG
7	Tone (CED/CNG)	7:TONE

TABLE-4: Speed/Frequency in the Signal send mode

MODE #	MENU ITEM 1	MENU ITEM 2	MENU ITEM 3	MENU ITEM 4
3	1:V.17 14400BPS	2:V.17 12000BPS	3:V.17 9600BPS	4:V.17 7200BPS
4	1:V.29 9600BPS	2:V.29 7200BPS		
5	1:V27ter 4800BPS	2:V27ter 2400BPS		
6	1:FLAG 300BPS			
7	1:TONE 2100Hz	2:TONE 1100Hz		

TABLE-5: Data which is sent in the Signal send mode

MODE #	MENU (DATA)	DISPLAY
1	00000000b	1:00000000b
2	11111111b	2:11111111b
3	01010101b	3:01010101b

(5) Image memory clear mode

	Procedure	LCD	Operation
1	Press FUNCTION, 9, ∗, 8, #, 7.	DIAGNOSTIC MODE ROM VERSION = <version>	
2	Press ENTER.	DIAGNOSTIC MODE SELECT MENU(← →)	
3	Press 1, 0.	10:IMAGE MEM CLEAR 1:OK 2:CANCEL	
4	Press 1.	DIAGNOSTIC MODE SELECT MENU(← →)	The image data are cleared and this mode is terminated.

(6) Dial test / adjustment mode (Pulse 10PPS)

	Procedure	LCD	Operation
1	Press FUNCTION, 9, ∗, 8, #, 7.	DIAGNOSTIC MODE ROM VERSION = <version>	
2	Press ENTER.	DIAGNOSTIC MODE SELECT MENU(← →)	
3	Press 1, 4.	14:DIAL TEST 10 PPS MAKE RATIO = ##%	The current make ratio setup is displayed on ##.
4	Press ← or →. (If there is no need to adjust, no need to press.)	14:DIAL TEST 10 PPS MAKE RATIO = ##%	Press ← to decrease by 1%. Press → to increase by 1%.
5	Press ENTER.		"1590" is dialed.
6	(Adjustment/test end) Press STOP.		This mode is terminated.
	(To continue adjustment/test) Return to 4.		

(7) Dial test mode (Tone)

	Procedure	LCD	Operation
1	Press FUNCTION, 9, ∗, 8, #, 7.	DIAGNOSTIC MODE ROM VERSION = <version>	
2	Press ENTER.	DIAGNOSTIC MODE SELECT MENU(← →)	
3	Press 1, 6.	16:DIAL TEST TONE	"123456789∗0#" is dialed. This mode is terminated.

(8) Print out soft switch mode

	Procedure	LCD	Operation
1	Press FUNCTION, 9, ∗, 8, #, 7.	DIAGNOSTIC MODE ROM VERSION = <version>	
2	Press ENTER.	DIAGNOSTIC MODE SELECT MENU(← →)	
3	Press 2, 1.	21:PRINT SOFT SW	The soft switch list is printed. This mode is terminated.

(9) Panel check mode

	Procedure	LCD	Operation
1	Press FUNCTION, 9, ∗, 8, #, 7.	DIAGNOSTIC MODE ROM VERSION = <version>	
2	Press ENTER.	DIAGNOSTIC MODE SELECT MENU(← →)	
3	Press 4, 2.	42:FAX PANEL TEST	
4	Press any key.	42:FAX PANEL TEST <key name>	The name of the pressed key is displayed in the lower stage of the LCD.
5	Press STOP.		This mode is terminated.

(10) Signal detect mode

	Procedure	LCD	Operation
1	Press FUNCTION, 9, ∗, 8, #, 7.	DIAGNOSTIC MODE ROM VERSION = <version>	
2	Press ENTER.	DIAGNOSTIC MODE SELECT MENU(← →)	
3	Press 4, 3.	43:SIG. DETECT	
4	(When DTMF signal is detected)	43:SIG. DETECT DTMF:<number>	
	(When CNG signal is detected)	43:SIG. DETECT CNG	
	(When QUIET signal is detected)	43:SIG. DETECT QUIET	
	(To terminate this mode) Press STOP.		This mode is terminated.

(11) Long distance comm select mode

	Procedure	LCD	Operation
1	Press FUNCTION, 9, ∗, 8, #, 7.	DIAGNOSTIC MODE ROM VERSION = <version>	
2	Press ENTER.	DIAGNOSTIC MODE SELECT MENU(← →)	
3	Press 4, 4.	44:LONG DIST COMM 1:SET 2:CLEAR	To terminate this mode, press STOP.
4	Select the mode.		To register → 10 To cancel registration → 20
10	Press 1.	SET ENTER # OR RAPID	
11	Press the desired one touch key or the speed dial (2 digits) to be registered.	SELECT SPEED 1:9600BPS 2:4800BPS	
12	Select the speed. (Press 1 or 2.)	<Name or Number> STORED	
13	Return to 3.		
20	Press 2.	CLEAR ENTER # OR RAPID	
21	Press the desired one-touch key or speed dial (2 digits) to be canceled.	<Name or Number> CLEARED	
22	Return to 3.		

Note:
- One-touch keys and speed dials which are not registered cannot be designated.
- When one-touch keys and speed dials which are registered are canceled, this setup is also canceled.
- The group key and the polling key cannot be designated.

4. Software switch for FAX (AR-F152 only)

A. Software Switch List

This machine is provided with the following software switches for the use by a serviceman.
The setup items of SW21 and later correspond to user setup one-to-one.
Since SW17 ~ 20 are assigned to adjustment values, they are not cleared by Memory Clear.

<table>
<tr><th>SW No.</th><th>Bit No.</th><th>ITEM</th><th>Soft SW setting and function</th><th>Factory Setting</th></tr>
<tr><td>1</td><td>1</td><td>300dpi reception enable</td><td>Used to set enable/disable of 300 × 300dpi reception.
1 : Enable | 0 : Disable</td><td>0</td></tr>
<tr><td></td><td>2</td><td>200 × 400dpi reception enable</td><td>Used to set enable/disable of 200 × 400dpi reception.
1 : Enable | 0 : Disable</td><td>1</td></tr>
<tr><td></td><td>3
4
5</td><td>Max. modem speed in reception</td><td>Used to limit the max. reception speed of Modem to 14400bps, 12000bps, 9600bps, 7200bps, 4800bps, 2400bps.
<table><tr><th>Bit No.</th><th>14400 BPS</th><th>12000 BPS</th><th>9600 BPS</th><th>7200 BPS</th><th>4800 BPS</th><th>2400 BPS</th></tr><tr><td>3</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>4</td><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td></tr><tr><td>5</td><td>*</td><td>*</td><td>1</td><td>0</td><td>1</td><td>0</td></tr></table></td><td>1
1
0</td></tr>
<tr><td></td><td>6
7
8</td><td>Max. modem speed in sending</td><td>Used to limit the max. sending speed of Modem to 14400bps, 12000bps, 9600bps, 7200bps, 4800bps, 2400bps.
<table><tr><th>Bit No.</th><th>14400 BPS</th><th>12000 BPS</th><th>9600 BPS</th><th>7200 BPS</th><th>4800 BPS</th><th>2400 BPS</th></tr><tr><td>6</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>7</td><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td></tr><tr><td>8</td><td>*</td><td>*</td><td>1</td><td>0</td><td>1</td><td>0</td></tr></table></td><td>1
1
0</td></tr>
<tr><td>2</td><td>1
2
3
4</td><td>Silent detection threshold value</td><td>Used to set the threshold value of silent detection in the answering and recording mode.

Threshold = 8 × Bit1 + 4 × Bit2 + 2 × Bit3 + 1 × Bit4
Factory setting = 8</td><td>1
0
0
0</td></tr>
<tr><td></td><td>5
6
7
8</td><td>Silent detection start time</td><td>Used to set the silent detection start time in the answering and recording mode. The time set with this switch is that from connection of the line to silent detection start.

TIME = 8 × Bit5 + 4 × Bit6 + 2 × Bit7 + 1 × Bit8 sec
Factory setting = 8 × 0 + 4 × 1 + 2 × 0 + 1 × 1 = 5 sec</td><td>0
1
0
1</td></tr>
<tr><td>3</td><td>1
2
3
4</td><td>CNG detection threshold value (AUTO, MANUAL mode)</td><td>Used to set the threshold value of CNG signal detection.

Threshold = 8 × Bit1 + 4 × Bit2 + 2 × Bit3 + 1 × Bit4
Factory setting = 7</td><td>0
1
1
1</td></tr>
<tr><td></td><td>5
6
7
8</td><td>CNG detection threshold value (A. M. mode Type 2)</td><td>Used to set the threshold value of CNG signal detection in the A.M. mode when SW4-8 is set to Type 2.

Threshold = 8 × Bit1 + 4 × Bit2 + 2 × Bit3 + 1 × Bit4
Factory setting = 3</td><td>0
0
1
1</td></tr>
</table>

<table>
<tr><th>SW No.</th><th>Bit No.</th><th>ITEM</th><th>Soft SW setting and function</th><th>Factory Setting</th></tr>
<tr><td>4</td><td>1
2</td><td>Silent detection end time</td><td>Used to set the silent detection end time in the answering and recording mode. The time set with this switch is that from the last call sound to the silent detection end.<table><tr><th>Bit No.</th><th>No limit</th><th>60sec</th><th>45sec</th><th>30sec</th></tr><tr><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr><tr><td>2</td><td>1</td><td>0</td><td>1</td><td>0</td></tr></table></td><td>0
1</td></tr>
<tr><td></td><td>3
4</td><td>Number of times of CNG detection</td><td>Used to set the required number of times of CNG detection for recognition of CNG signal one time.
Number of times = 2 × Bit5 + 1 × Bit6 + 1
Factory setting = 2 × 1 + 1 × 0 + 1 = 3 times</td><td>1
0</td></tr>
<tr><td></td><td>5</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>6</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>7</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>8</td><td>A.M. mode signal detection filter</td><td>Used to select the CNG signal detection filter in the answering and recording mode.<table><tr><td>1: Type 2</td><td>Similar to SW3-5, -6, -7, and -8.</td></tr><tr><td>0: Type 1</td><td>Same as the others. Similar to SW3-1, -2, -3, and -4.</td></tr></table></td><td>0</td></tr>
<tr><td>5</td><td>1</td><td>Max. reception length</td><td>Used to set or not to set the max. reception length of FAX documents. When this function is enabled, a reception length of 1.5m or above is treated as a communication error.<table><tr><td>1 : No limit</td><td>0 : 1.5 m</td></tr></table></td><td>0</td></tr>
<tr><td></td><td>2</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>3</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>4
5</td><td>Line monitor</td><td>When this function is enabled, the sound of the line under FAX session can be heard.<table><tr><th>Bit No.</th><th>Always ON</th><th>Until response</th><th>OFF</th></tr><tr><td>4</td><td>1</td><td>0</td><td>0</td></tr><tr><td>5</td><td>*</td><td>1</td><td>0</td></tr></table></td><td>0
0</td></tr>
<tr><td></td><td>6</td><td>Protocol monitor (LCD)</td><td>When this function is enabled, the signal name under FAX session is displayed on the LCD in real time.<table><tr><td>1 : ON</td><td>0 : OFF</td></tr></table></td><td>0</td></tr>
<tr><td></td><td>7
8</td><td>Protocol monitor (Report)</td><td>When this function is enabled, the detailed report on communication is provided after completion of FAX sending or reception.<table><tr><th>Bit No.</th><th>Always ON</th><th>Error Only</th><th>OFF</th></tr><tr><td>7</td><td>1</td><td>0</td><td>0</td></tr><tr><td>8</td><td>*</td><td>1</td><td>0</td></tr></table></td><td>0
0</td></tr>
<tr><td>6</td><td>1
2
3
4</td><td>Signal send level</td><td>This mode is used to set the FAX signal send level.
The effective set range is –1 dBm to –16 dBm.
The values are mere estimation figures because they are affected by DAA.

LEVEL = –8 × Bit1 –4 × Bit2 –2 × Bit3 –0 × Bit4 –1 dBm
Factory setting = –9 dBm (Set for each destination)
(When modem speed ≥ 7200 bps :
If setting is –1 or –2 dBm , the level is forced to –3 dBm.)</td><td>1
0
0
0</td></tr>
<tr><td></td><td>5</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>6</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>7</td><td>Dial tone detection</td><td>Used to set ON/OFF of dial tone detection before dialing for FAX sending.
When this function is set to ON, dialing is started after detection of the dial tone.
When this function is set to OFF, dialing is started after the set time of “Interval between OFF-HOOK and dial send” regardless of dial tone detection.<table><tr><td>1 : ON</td><td>0 : OFF</td></tr></table></td><td>1</td></tr>
</table>

<table>
<tr><th>SW No.</th><th>Bit No.</th><th>ITEM</th><th>Soft SW setting and function</th><th>Factory Setting</th></tr>
<tr><td>6</td><td>8</td><td>Busy tone detection</td><td>Used to set ON/OFF of busy tone detection. When this function is set to ON, if busy tone is detected, transmission is interrupted and the machine enters the recall mode.
<table><tr><td>1 : ON</td><td>0 : OFF</td></tr></table></td><td>1</td></tr>
<tr><td>7</td><td>1
2
3
4</td><td>Reception sensitivity offset</td><td>Used to set the FAX signal reception level offset. The set range is –8dBm to +7dBm.
The values are mere estimation figures because they are affected by DAA.
When “Auto reception sensitivity adjustment” is set to Enable, this setup is disabled.

Sensitivity offset =
–8 × Bit1 + 4 × Bit2 + 2 × Bit3 + Bit4 dBm
Factory setting = 0 dBm</td><td>0
0
0
0</td></tr>
<tr><td></td><td>5</td><td>Auto reception sensitivity adjustment</td><td>When this function is set to Enable, the Modem automatically adjusts the received signal gain.
<table><tr><td>1 : Enable</td><td>0 : Disable</td></tr></table></td><td>1</td></tr>
<tr><td></td><td>6
7</td><td>Transmission Line Equalizer</td><td>Used to select the frequency characteristics in the signal send level.
This function is provided to absorb the difference in frequency characteristics between lines.
When communication errors occur frequently, another equalizer must be selected.
Gain (dB) for 2000Hz
<table><tr><th>Frequency</th><th>None</th><th>Equalizer 1</th><th>Equalizer 2</th><th>Equalizer 3</th></tr><tr><td>500</td><td>0</td><td>+1.2</td><td>–1.0</td><td>–1.5</td></tr><tr><td>1000</td><td>0</td><td>–0.4</td><td>–1.1</td><td>–4.1</td></tr><tr><td>1500</td><td>0</td><td>–0.4</td><td>–0.6</td><td>–3.6</td></tr><tr><td>2500</td><td>0</td><td>+0.7</td><td>+0.9</td><td>+2.4</td></tr><tr><td>3000</td><td>0</td><td>+2.5</td><td>+2.5</td><td>+4.9</td></tr></table><table><tr><th>Bit No.</th><th>None</th><th>Equalizer 1</th><th>Equalizer 2</th><th>Equalizer 3</th></tr><tr><td>6</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>7</td><td>0</td><td>1</td><td>0</td><td>1</td></tr></table></td><td>0
1</td></tr>
<tr><td></td><td>8</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>8</td><td>1</td><td>Non-modulation carrier send in V.29</td><td>Non-modulation carriers are not required for V.29 Modem transmission in ITU-TS standards. However, non-modulation carriers can be sent in advance to image signals.
This function is effective to avoid communication troubles due to echoes in oversea communication.
<table><tr><td>1 : ON</td><td>0 : OFF</td></tr></table></td><td>0</td></tr>
<tr><td></td><td>2</td><td>CED tone signal interval</td><td>Used to set the time interval between the CED signal and the NSF signal.
This function is effective to avoid communication troubles due to echoes in oversea communication.
<table><tr><td>1 : 500 msec</td><td>0 : 75 msec</td></tr></table></td><td>0</td></tr>
<tr><td></td><td>3</td><td>Communication error process when receiving RTN</td><td>Used to set the communication error process for received RTN when there is an error in transmitted image data and RTN is returned.
<table><tr><td>1 : Not transmission error</td><td>0 : Transmission error</td></tr></table></td><td>1</td></tr>
<tr><td></td><td>4</td><td>NSF receive acknowledge</td><td>Used to select between DIS signal recognition at 2-time reception of DIS signal and DIS signal recognition at DIS signal reception after NSF signal.
This function is effective to avoid communication troubles due to echoes in oversea communication.
<table><tr><td>1 : Twice</td><td>0 : Once for NSF reception,
Twice for DIS reception</td></tr></table></td><td>0</td></tr>
</table>

<table>
<tr><th>SW No.</th><th>Bit No.</th><th>ITEM</th><th>Soft SW setting and function</th><th>Factory Setting</th></tr>
<tr><td rowspan="4">8</td><td>5</td><td>EOL detection timer</td><td>Used to set the EOL (End of Life) detection time to 25sec or 13sec. This function is effective to avoid a communication error due to long EOL of certain models.
<table><tr><td>1 : 25 sec</td><td>0 : 13 sec</td></tr></table></td><td>0</td></tr>
<tr><td>6</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>7</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>8</td><td>ECM</td><td>Used to set ON/OFF of ECM.
<table><tr><td>1 : ON</td><td>0 : OFF</td></tr></table></td><td>1</td></tr>
<tr><td rowspan="5">9</td><td>1
2</td><td>Interval between OFF-HOOK and dial send</td><td>Used to set the delay from OFF-HOOK when starting dialing to actual send start of the dial signal.
If the dial tone detection function is enabled, this setup is ignored.
<table><tr><th>Bit No.</th><th>0.5sec</th><th>1sec</th><th>2sec</th><th>3sec</th></tr><tr><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>2</td><td>0</td><td>1</td><td>0</td><td>1</td></tr></table></td><td>1
1</td></tr>
<tr><td>3</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>4</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>5
6</td><td>Reserved</td><td></td><td>0
0</td></tr>
<tr><td>7
8</td><td>Reserved</td><td></td><td>0
0</td></tr>
<tr><td rowspan="6">10</td><td>1</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>2</td><td>FAST</td><td>Used to set Enable/Disable of RMS (FAST) function.
<table><tr><td>1 : Enable</td><td>0 : Disable</td></tr></table></td><td>0</td></tr>
<tr><td>3</td><td>Reserved</td><td></td><td>1</td></tr>
<tr><td>4</td><td>Basic resolution</td><td>Used to select the basic resolution for scanning and printing.
<table><tr><td>1 : Inch series</td><td>0 : Metric series</td></tr></table></td><td>0</td></tr>
<tr><td>5</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>6
7
8</td><td>Language</td><td>Used to select the language displayed on the LCD and the report. The correspondence between language N and the actual language differs depending on the destination.
<table><tr><th></th><th>Language 1</th><th>Language 2</th><th>Language 3</th></tr><tr><td>For North America</td><td>American English</td><td>French</td><td>Spanish</td></tr></table><table><tr><th>Bit No.</th><th>Lan-guage 1</th><th>Lan-guage 2</th><th>Lan-guage 3</th><th colspan="5">Reserved</th></tr><tr><td>6</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr><tr><td>7</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>8</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td></tr></table></td><td>0
0
0</td></tr>
</table>

<table>
<tr><th>SW No.</th><th>Bit No.</th><th>ITEM</th><th>Soft SW setting and function</th><th>Factory Setting</th></tr>
<tr><td>11</td><td>1</td><td>Header</td><td>Used to set the header attachment to the transmitting document.
1 : Not attached | 0 : Attached</td><td>0</td></tr>
<tr><td></td><td>2</td><td>Header in data transfer</td><td>Used to set the header attachment to the transferring document.
1 : Not attached | 0 : Attached</td><td>0</td></tr>
<tr><td></td><td>3</td><td>Training (EQM) threshold value</td><td>Used to select the threshold value to judge Success/Failure of training in reception of training.
1 : Easy to fall back | 0 : Normal</td><td>0</td></tr>
<tr><td></td><td>4</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>5
6
7</td><td>Non ECM error judgement threshold value</td><td><table><tr><th>Bit 5, 6, 7</th><th>RTP</th><th>RTN</th></tr><tr><td>000</td><td>32</td><td>64</td></tr><tr><td>001</td><td>16</td><td>32</td></tr><tr><td>010</td><td>12</td><td>24</td></tr><tr><td>011</td><td>8</td><td>16</td></tr><tr><td>100</td><td>6</td><td>12</td></tr><tr><td>101</td><td>4</td><td>8</td></tr></table></td><td>0
1
0</td></tr>
<tr><td></td><td>8</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>12</td><td>1
2
3
4
5</td><td>Activity Report Auto Listing time</td><td>Used to set the start time of Activity Report.
Setup is made in the unit of one hour, and setup of minutes cannot be made.

Print start time =
Bit1 × 16 + Bit2 × 8 + Bit3 × 4 + Bit4 × 2 + Bit5 hour 00 min
Set range = 0 ~ 23
Factory Setting = 00:00</td><td>0
0
0
0
0</td></tr>
<tr><td></td><td>6</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>7</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>8</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>13</td><td>1</td><td>Auto recall in direct send</td><td>1 : Enable | 0 : Disable</td><td>0</td></tr>
<tr><td></td><td>2</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>3</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>4</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>5</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>6</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>7
8</td><td>Effective compression system in reception</td><td><table><tr><th>Bit No.</th><th>MH, MR, MMR</th><th>MH, MR</th><th>MH, MMR</th><th>MH</th></tr><tr><td>7</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>8</td><td>0</td><td>1</td><td>0</td><td>1</td></tr></table></td><td>0
0</td></tr>
<tr><td>14</td><td>1</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>2</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>3</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>4</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>5</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>6</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>7</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>8</td><td>Reserved</td><td></td><td>0</td></tr>
</table>

SW No.	Bit No.	ITEM	Soft SW setting and function	Factory Setting
15	1	Reserved		0
	2	Reserved		0
	3	Reserved		0
	4	Reserved		0
	5	Reserved		0
	6	Reserved		0
	7	Reserved		0
	8	Reserved		0
16	1	RING signal frequency check	Used to select the allowable frequency range of RING signal. Used to perform a communication test by using a simple switchboard in production process. 1 : To be checked / 0 : Not to be checked	1
	2	Reserved		0
	3	Reserved		0
	4	Reserved		0
	5	Reserved		0
	6	Reserved		0
	7	Reserved		0
	8	Reserved		0
17	1 2 3 4	Pulse dial signal make ratio adjustment (10PPS)	Used to adjust the make ratio of 10PPS pulse dial signal. The set range is –8% to +7%. Offset = –8 × Bit1 + 4 × Bit2 + 2 × Bit3 + 1 × Bit4 % Factory setting = 0 %	0 0 0 0
	5 6 7 8	Reserved		0 0 0 0
18	1	Reserved		0
	2	Reserved		0
	3	Reserved		0
	4	Reserved		0
	5	Reserved		0
	6	Reserved		0
	7	Reserved		0
	8	Reserved		0
19	1	Reserved		0
	2	Reserved		0
	3	Reserved		0
	4	Reserved		0
	5	Reserved		0
	6	Reserved		0
	7	Reserved		0
	8	Reserved		0
20	1	Reserved		0
	2	Reserved		0
	3	Reserved		0
	4	Reserved		0
	5	Reserved		0
	6	Reserved		0
	7	Reserved		0
	8	Reserved		0

<table>
<tr><th>SW No.</th><th>Bit No.</th><th>ITEM</th><th>Soft SW setting and function</th><th>Factory Setting</th></tr>
<tr><td>21</td><td>1
2</td><td>Record paper size</td><td>Used to set the reception document size and the report output paper size. When set to Auto, the paper size is automatically selected according to the data size and the reduction ratio in reception.
<table><tr><th>Bit No.</th><th>Letter</th><th>Legal</th><th>A4</th><th>AUTO</th></tr><tr><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>2</td><td>0</td><td>1</td><td>0</td><td>1</td></tr></table></td><td>1
1</td></tr>
<tr><td></td><td>3</td><td>Picture quality priority selection</td><td>Used to set the default resolution in sending.
<table><tr><td>1 : Fine</td><td>0 : Standard</td></tr></table></td><td>0</td></tr>
<tr><td></td><td>4</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>5
6
7
8</td><td>Number of reception start calls</td><td>Used to set the number of calls before reception in the auto reception mode. The set range is 0 to 9 times.

Number = 8 × Bit5 + 4 × Bit6 + 2 × Bit7 + 1 × Bit8 rings
Set range : 0 –9</td><td>0
0
1
0</td></tr>
<tr><td>22</td><td>1
2
3
4</td><td>Number of auto reception select</td><td>Used to set the number of calls before reception in the manual reception mode. This setup is used as a backup function when the external telephone does not respond. The set range is OFF and 1 to 9 times.

Number = 8 × Bit1 + 4 × Bit2 + 2 × Bit3 + 1 × Bit4 rings
Set range : 0(= OFF), 1 –9</td><td>0
0
0
0</td></tr>
<tr><td></td><td>5</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>6
7
8</td><td>Result list print</td><td>Used to set the printing conditions of the result list after completion of communication.
<table><tr><th>Bit No.</th><th>Always</th><th>Err/Tim</th><th>Send</th><th>Never</th><th>Error</th></tr><tr><td>6</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr><tr><td>7</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td></tr><tr><td>8</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr></table></td><td>0
0
1</td></tr>
<tr><td>23</td><td>1
2
3
4</td><td>Number of recall times</td><td>Used to set the number of times of recalls when sending is not normally completed due to busy status of the other party or a communication error.
The set range is OFF and 1 to 14 times. For some causes of the communication error, however, the number of times of recalls must be set to a smaller level.

Recall Times = 8 × Bit1 + 4 × Bit2 + 2 × Bit3 + 1 × Bit4 times
Set range : 0(= OFF), 1 –14</td><td>0
0
1
0</td></tr>
<tr><td></td><td>5
6
7
8</td><td>Recall interval</td><td>Used to set the recall interval when a transmission is not normally completed due to busy status of the other party or a communication error.
The set range is 1 to 15 minutes.

Recall Interval = 8 × Bit5 + 4 × Bit6 + 2 × Bit7 + 1 × Bit8 min
Set range : 1 –15</td><td>0
1
0
1</td></tr>
<tr><td>24</td><td>1
2
3
4</td><td>Remote select number</td><td>Used to select the first digit of the select request signal when selecting from the external telephone to FAX reception. The set range is 0 to 9.

Number = 8 × Bit1 + 4 × Bit2 + 2 × Bit3 + 1 × Bit4
Set range : 0 – 9</td><td>0
1
0
1</td></tr>
<tr><td></td><td>5</td><td>Remote reception</td><td>Used to set whether “Remote select number” + “**” from an external telephone is detected and switched to FAX reception or not.
<table><tr><td>1 : ON</td><td>0 : OFF</td></tr></table></td><td>1</td></tr>
<tr><td></td><td>6</td><td>FAX signal reception</td><td>Used to set whether CNG signal is detected during OFF-HOOK and switched to FAX reception or not.
<table><tr><td>1 : ON</td><td>0 : OFF</td></tr></table></td><td>1</td></tr>
</table>

<table>
<tr><th>SW No.</th><th>Bit No.</th><th>ITEM</th><th>Soft SW setting and function</th><th>Factory Setting</th></tr>
<tr><td>24</td><td>7</td><td>Auto cover paper</td><td>Used to set whether a cover is attached to the last page in every transmission or not.
<table><tr><td>1 : ON</td><td>0 : OFF</td></tr></table></td><td>0</td></tr>
<tr><td></td><td>8</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>25</td><td>1
2
3</td><td>Record list auto print</td><td>Used to set the interval of automatic printing of the record list.
<table><tr><th>Bit No.</th><th>OFF</th><th>1 day</th><th>2 days</th><th>4 days</th><th>1 week</th></tr><tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr><tr><td>2</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td></tr><tr><td>3</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr></table></td><td>0
0
0</td></tr>
<tr><td></td><td>4</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>5</td><td>Reduction ratio in reception</td><td>Used to set the magnification ratio of printing received documents. When AUTO is selected, the ratio is automatically determined according to the received document size and the output paper.
<table><tr><td>1 : 100%</td><td>0 : AUTO</td></tr></table></td><td>0</td></tr>
<tr><td></td><td>6</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>7
8</td><td>Communication end buzzer time</td><td>Used to set the time of buzzer sound to notify the end of communication.
<table><tr><th>Bit No.</th><th>3 Seconds</th><th>1 Second</th><th>No Beep</th></tr><tr><td>7</td><td>0</td><td>0</td><td>1</td></tr><tr><td>8</td><td>0</td><td>1</td><td>0</td></tr></table></td><td>0
0</td></tr>
<tr><td>26</td><td>1
2
3</td><td>Buzzer sound volume</td><td>Used to set the sound volumes of all buzzers except for call ring.
<table><tr><th>Bit No.</th><th>MAX</th><th>HIGH</th><th>MED</th><th>LOW</th><th>MIN</th><th>OFF</th></tr><tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>2</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td></tr><tr><td>3</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td></tr></table></td><td>0
1
0</td></tr>
<tr><td></td><td>4</td><td>Key click sound</td><td>Used to set whether the click sound is made or not when pressing a key on the FAX panel.
<table><tr><td>1 : ON</td><td>0 : OFF</td></tr></table></td><td>1</td></tr>
<tr><td></td><td>5
6
7</td><td>Incoming Ring Volume</td><td>Used to set the sound volume of call ring.
<table><tr><th>Bit No.</th><th>MAX</th><th>HIGH</th><th>MED</th><th>LOW</th><th>MIN</th><th>OFF</th></tr><tr><td>5</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>6</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td></tr><tr><td>7</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td></tr></table></td><td>0
1
0</td></tr>
<tr><td></td><td>8</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>27</td><td>1
2
3</td><td>Distinctive Ring</td><td>Used to set the RING signal pattern to start FAX reception with Distinctive Ring.
<table><tr><th>Bit No.</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>Standard</th><th>OFF</th></tr><tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td></tr><tr><td>2</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td></tr><tr><td>3</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr></table></td><td>1
1
0</td></tr>
<tr><td></td><td>4</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td></td><td>5</td><td>Footer</td><td>Used to set ON/OFF of the footer attached under each page data when printing received documents.
<table><tr><td>1 : ON</td><td>0 : OFF</td></tr></table></td><td>0</td></tr>
</table>

<table>
<tr><th>SW No.</th><th>Bit No.</th><th>ITEM</th><th>Soft SW setting and function</th><th>Factory Setting</th></tr>
<tr><td rowspan="3">27</td><td>6</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>7</td><td>Telephone line kind</td><td>Used to select the kind of telephone line (tone or pulse).
1 : TONE | 0 : PULSE</td><td rowspan="2">Tone</td></tr>
<tr><td>8</td><td>Reserved</td><td></td></tr>
<tr><td rowspan="8">28</td><td>1
2
3
4</td><td>A.M. mode
Silent detection time</td><td>Used to set the silent detection time in the answering and recording mode.
The set range is OFF and 1 to 10sec.

Time = 8 × Bit1 + 4 × Bit2 + 2 × Bit3 + 1 × Bit4 sec
Effective : 0(= OFF), 1 –10</td><td>0
1
0
1</td></tr>
<tr><td>5</td><td>A.M. mode auto reception select</td><td>Used to set whether FAX reception is started or not after 6 call rings if the answering function does not work for some reasons in the answering and recording mode.
1 : ON | 0 : OFF</td><td>0</td></tr>
<tr><td>6</td><td>Annoying FAX prevention function</td><td>Used to set ON/OFF of the annoying FAX prevention function.
1 : ON | 0 : OFF</td><td>0</td></tr>
<tr><td>7</td><td>Polling function</td><td>Used to set whether one-touch key “20” is used as the polling key or not.
1 : ON | 0 : OFF</td><td>0</td></tr>
<tr><td>8</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td rowspan="8">29</td><td>1
2</td><td>Record paper size (Main Tray)</td><td>Used to set the record paper size in the main tray.
<table>
<tr><th>Bit No.</th><th>Letter</th><th>Legal</th><th>A4</th><th>Other</th></tr>
<tr><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr>
<tr><td>2</td><td>0</td><td>1</td><td>0</td><td>1</td></tr>
</table></td><td>0
0</td></tr>
<tr><td>3</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>4
5</td><td>Record paper size (2nd Tray)</td><td>Used to set the record paper size in the 2nd tray.
<table>
<tr><th>Bit No.</th><th>Letter</th><th>Legal</th><th>A4</th><th>Other</th></tr>
<tr><td>4</td><td>0</td><td>0</td><td>1</td><td>1</td></tr>
<tr><td>5</td><td>0</td><td>1</td><td>0</td><td>1</td></tr>
</table></td><td>0
0</td></tr>
<tr><td>6</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>7</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>8</td><td>Index print</td><td>Used to set whether marking is made to the lead edge of paper or not to identify the job when printing the received data.
1 : ON | 0 : OFF</td><td>1</td></tr>
<tr><td rowspan="8">30</td><td>1</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>2</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>3</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>4</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>5</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>6</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>7</td><td>Reserved</td><td></td><td>0</td></tr>
<tr><td>8</td><td>Reserved</td><td></td><td>0</td></tr>
</table>

5. TROUBLE CODES

A. Trouble codes list

Main code	Sub code	Trouble content	Detail of trouble
E7	01	Duplex model memory setup error, memory not-detected error	The memory is not set properly or the memory capacity is not set to the duplex setup (6M). Cancel method: Set SIM 26-39 code number to 2.
E7	03	HSYNC not detected.	LSU (laser diode, reception element, APC circuit) trouble LSU drive circuit (ASIC) trouble
E7	04	CCD white level trouble	CCD drive circuit (CCD PWB, ASIC harness) trouble Copy lamp lighting trouble (Copy lamp, invertor PWB)
E7	05	CCD black level trouble	CCD drive circuit (CCD PWB, ASIC, harness) trouble
E7	12	Shading trouble (White correction)	Dirt on white plate for scanning white level
E7	14	ASIC connection trouble	Improper connection between CPU and ASIC (pattern cut, improper connection of lead pin)
E7	15	Copy lamp disconnection trouble	Copy lamp or copy lamp drive circuit (invertor PWB) trouble Copy lamp disconnection
E7	16	Abnormal output of laser	LSU (laser diode, reception element, APC circuit) trouble LSU drive circuit (ASIC) trouble
L1	00	Feeding is not completed within the specified time after starting feeding.	When the mirror base is returned for the specified time (6 sec) in mirror initializing after turning on the power, the mirror home position sensor (MHPS) does not turn OFF. Or when the mirror base is fed for the specified time (about 6 sec) after start of copy return, the mirror home position sensor (MHPS) does not turn OFF.
L3	00	Return is not completed within the specified time.	When the mirror base is returned for the specified time (6 sec) in mirror initializing after turning on the power, the mirror home position sensor (MHPS) does not turn ON.Or when the mirror base is returned for the specified time (about 6 sec) after start of copy return, the mirror home position sensor (MHPS) does not turn ON.
L4	01	Main motor lock	When the main motor encoder pulse is not detected for 100msec.
L6	10	Polygon motor lock	The lock signal (specified rpm signal) does not return within a certain time (about 20sec) from starting the polygon motor rotation
H2	00	Thermistor open detection	The fusing thermistor is open.
H3	00	Heat roller abnormally high temperature	The fusing temperature rises above 240˚C.
H4	00	Heat roller abnormally low temperature	The fusing temperature does not reach 185˚C within 27 sec of turning on the power, or the fusing temperature keeps at 140˚C.
U2	01	Counter sum check error	When the counter check sum value stored in the EEPROM is abnormal.
U2	04	EEPROM serial communication error	When a communication trouble occurs with the EEPROM.
U2	40	CRUM IC	Serial communication error when a communication trouble occurs with the CRUM IC.
F2	04	Toner cartridge type error	When a toner cartridge of different type is used.
F6	80	Communication trouble with FAX PWB (Protocol)	Error in data reception from the FAX board to the MCU. Occurs when the message header of the message format is other than F. Cancel method: Turn OFF/ON the power.
F6	81	Communication trouble with FAX PWB (Parity)	Error in data reception from the FAX board to the MCU. Occurs when the odd number parity set with SMR (serial mode register) differs from the reception data. Cancel method: Turn OFF/ON the power.
F6	82	Communication trouble with FAX PWB (Overrun)	Error in data reception from the FAX board to the MCU Occurs when the next data reception is completed with RDRF (Receive Data Register Full) flag of SS (Reserial status register) set to 1. Cancel method: Turn OFF/ON the power.
F6	84	Communication trouble with FAX PWB (Framing)	Error in data reception from the FAX board to the MCU. Occurs when the stop bit is 0. (The stop bit must be 1.) Cancel method: Turn OFF/ON the power.
F6	88	Communication trouble with FAX PWB (Time-out)	Occurs when time is out without response in data communication between the FAX board and the MCU. Cancel method: Turn OFF/ON the power.
F6	10	FAX PWB trouble	Communication trouble between the MCU and the FAX board or between the FAX board and the FAX panel Cancel method: Turn OFF/ON the power. Check connections.

B. FAX Service Error Code Table

(1) LCD: FAX SERVICE ERROR(#)

Code #	Content	Remedy
1	ROM error	Turn OFF/ON the power. If the error is not canceled, check the ROM of the FAX PWB.
2	RAM error	Turn OFF/ON the power. If the error is not canceled, check the DRAM of the FAX PWB.
3	CTS error (Communication error)	Turn OFF/ON the power. If the error is not canceled, check connection between the FAX PWB and the MCU PWB. If no abnormality is found, check the FAX PWB and MCU PWB themselves., especially TXD, RXD, CTS, and RTS signals.
4	Panel error	Turn OFF/ON the power. If the error is not canceled, check the connector and the harness between the FAX PWB and the MCU PWB. If no abnormality is found, check the FAX PWB and MCU PWB themselves.
5	Scan data error	Turn OFF/ON the power and execute FAX scanning to check the operation. If the error is not canceled. Check connection between the FAX PWB and the MCU PWB. If no abnormality is found, check the FAX PWB and MCU PWB themselves.

Note: If some reception data is left in memory,, transfer the data with FUNCTION-0 and turn OFF the power.

C. Communication error code table

(1) Sending error

Code	Content
0	The handshake signal is detected, but the signal includes an error.
1	The handshake signal from the receiver is not recognized. (Error after reception of NSF/DIS)
2	The line is disconnected during data transmission.
3	The line is disconnected after fallback of training. (Error after reception of CFR)
4	The line is disconnected during transmission of two or more pages. (Error after reception of MCF)
5	Not defined.
6	Error after reception of RTN/RTP
7	An unexpected DCN is received.
8	Resend is repeated by the specified times, but the error is not canceled.
9	Not defined.
10	Not defined.
11	Not defined.
12	Error after fallback during transmission (Error after reception of CTR)
13	ERR is received, & errors other than the above.

(2) Reception error

Code	Content
0	The handshake signal is detected, but the signal includes an error.
1	The handshake signal from the receiver is not recognized. (Error after reception of NSF/DIS)
2	The handshake signal from the receiver is not recognized. (Error after reception of NSC/DTC)
3	The handshake signal from the receiver is not recognized. (Error after reception of EOP)
4	The handshake signal from the receiver is not recognized. (Error after reception of EOM)
5	The handshake signal from the receiver is not recognized. (Error after reception of MPS)
6	Not defined.
7	An unexpected DCN is received.
8	Error after reception of all pages (Error after reception of PPS-EOP)
9	Error after changing the communication mode (Error after reception of PPS-EOM)
10	Error after reception of a page (Error after reception of PPS-MPS/NULL)
11	Not defined.
12	Communication error after fallback during transmission (Error after reception of CTC)
13	Error after reception of EOR & errors other than the above

[10] USER PROGRAM

The conditions of factory setting can be changed according to the use conditions.

Functions which can be set with the user program

Function	Contents	Factory setting
Auto clear time	● When a certain time is passed after completion of copying, this function returns to the initial state automatically. The time to reach the initial state can be set in the range of 30 sec to 120 sec by the unit of 30 sec. This function can be disabled.	60 sec
Preheat	● When the copier is left unused with the power ON, the power consumption is automatically reduced to about 40Wh/H (∗ Note). The time to start this function can be set in the range of 30 sec to 90 sec by the unit of 30 sec. This function cannot be disabled. ● When this function is operated, the pre-heat lamp on the operation panel lights up. To return to the initial state, press any key on the operation panel. (When the COPY button is pressed, a copy is made after returning to the initial state.)	90 sec
Auto shut off timer	● When the copier is left unused with the power ON, the power consumption is automatically reduced to about 18Wh/H (∗ Note). The time to start this function can be set in the range of 2 min to 120 min. ● When this function is operated, all the lamps except for the pre-heat lamp on the operation panel turn off. To return to the initial state, press the COPY button.	5 min
Stream feeding	Only models with SPF.	Cancel
Auto shut off	● Used to set or cancel this function.	Set

∗Note: The power consumption values in preheat and auto shut off may be varied depending on the use conditions.

Setting the power save modes, auto clear time, and stream feeding mode

1) Press and hold down the light (◁) and dark (▷) keys simultaneously for more than 5 seconds until all the alarm indicators (☼ , ⚠ , ⁂ and 🚶) blink and "- -" appears in the display.
2) Use the left copy quantity (▲) key to select a user program number (1: auto clear time, 2: preheat mode, 3: auto power shut-off timer, 4: stream feeding mode, 5: auto power shut-off mode). The selected number will blink in the left side of the display.

Function name	Function code
Auto clear time	1
Preheat	2
Auto shut off timer	3
Stream feeding	4*
Auto shut off	5

[Cancel] If a wrong code is entered, press the clear key and enter the correct function code.

∗ SPF only

∗ The remaining toner quantity is displayed by pressing the % key for 5 sec before entering a program code in the user simulation mode.

3) Press the print (◈) key. The entered program number will be steadily lit and the currently selected parameter number for the program will blink on the right side of the display.
4) Select the desired parameter using the right copy quantity (▲) key. The entered parameter number will blink on the right of the display.

Function name	Set code	Function name	Set code	Function name	Set code	Function name	Set code	Function name	Set code
Auto clear time	0 (Cancel)	Preheat	0 (30 sec)	Auto shut off timer	0 (2 min)	Stream feeding	∗0 (Cancel)	Auto shut off	0 (Cancel)
	1 (30 sec)		1 (60 sec)		∗1 (5 min)		1 (Setting)		∗1 (Setting)
	∗2 (60 sec)		∗2 (90 sec)		2 (15 min)				
	3 (90 sec)				3 (30 min)				
	4 (120 sec)				4 (60 min)				
	5 (10 sec)				5 (120 min)				

∗ : Factory setting

5) Press the print (◈) key. The right-hand number in the display will be steadily lit and the entered value will be stored.
Note: To change the setting or to set another mode, press the clear (Ⓒ) key. The copier will return to step 2).
6) Press the light (◁) or dark (▷) key to return to the normal copy mode.

[11] MAINTENANCE

1. Maintenance table

X: Check (Clean, adjust, or replace when required.) ○: Clean ▲: Replace △: Adjust ☆: Lubricate

Section	Parts	25K	50K	75K	100K	125	Remark
Developing	Developer	▲	▲	▲	▲	▲	
	DV blade	○	▲	○	▲	○	
	DV side seal (F/R)	○	▲	○	▲	○	
Process peripheral	Drum	▲	▲	▲	▲	▲	

2. Maintenance display system

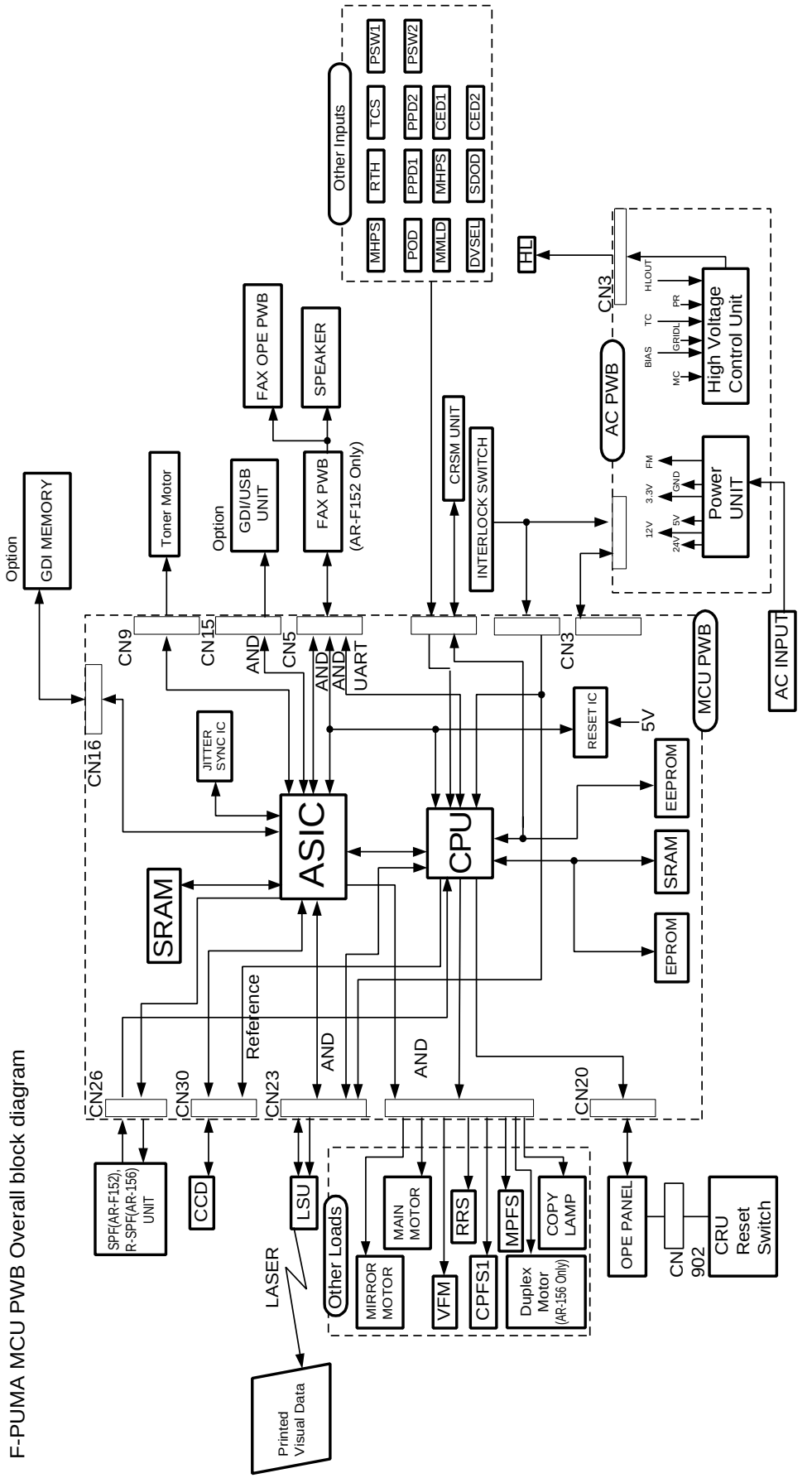
Toner	Life	6.5K	
	Remaining quantity check ∗1	a. Press and hold the density adjustment LIGHT key for more than 5 sec, and the machine will enter the user program mode. b. Press and hold the "%" key for more than 5 sec, and the remaining quantity will be displayed on the copy quantity display in one of the following levels: (Remaining quantity display levels: 100%, 75%, 50%, 25%, 10%, LO) c. Press the density adjustment LIGHT key to cancel.	
	Remaining quantity	NEAR EMPTY About 10%	EMPTY
	LED	ON	Flash
	Machine	Operation allowed	Stop
Developer	Life	25K	
	LED	ON at 25K of the developer count.	
	Machine	Selection is available between Not Stop and Stop by Service Simulation (SIM 26-37) Setup. (If Stop is selected, the LED will flash and stop at 25K.) ∗ Default: Not Stop ∗ Clear: SIM 24-06	
Maintenance	LED	Selection is available among 18K, 13K, 9K, 6K, 3K, and free (no lighting) with SIM 21-1. ∗ Default: free ∗ Clear: SIM 20-1	
	Machine	Not stop.	

∗1: Installation of a new toner cartridge allows to display the remaining quantity.

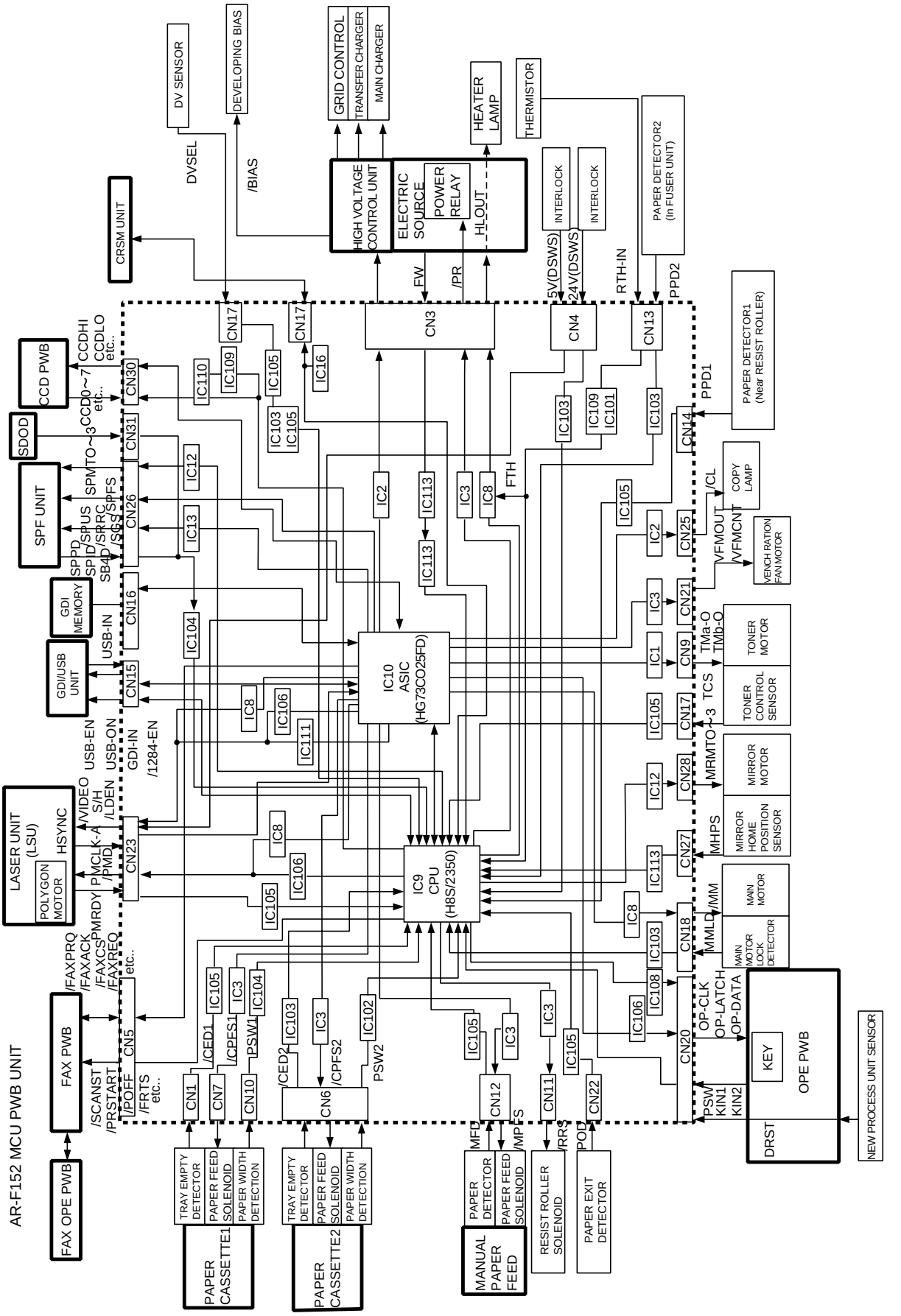
[12] ELECTRICAL SECTION

1. Block diagram

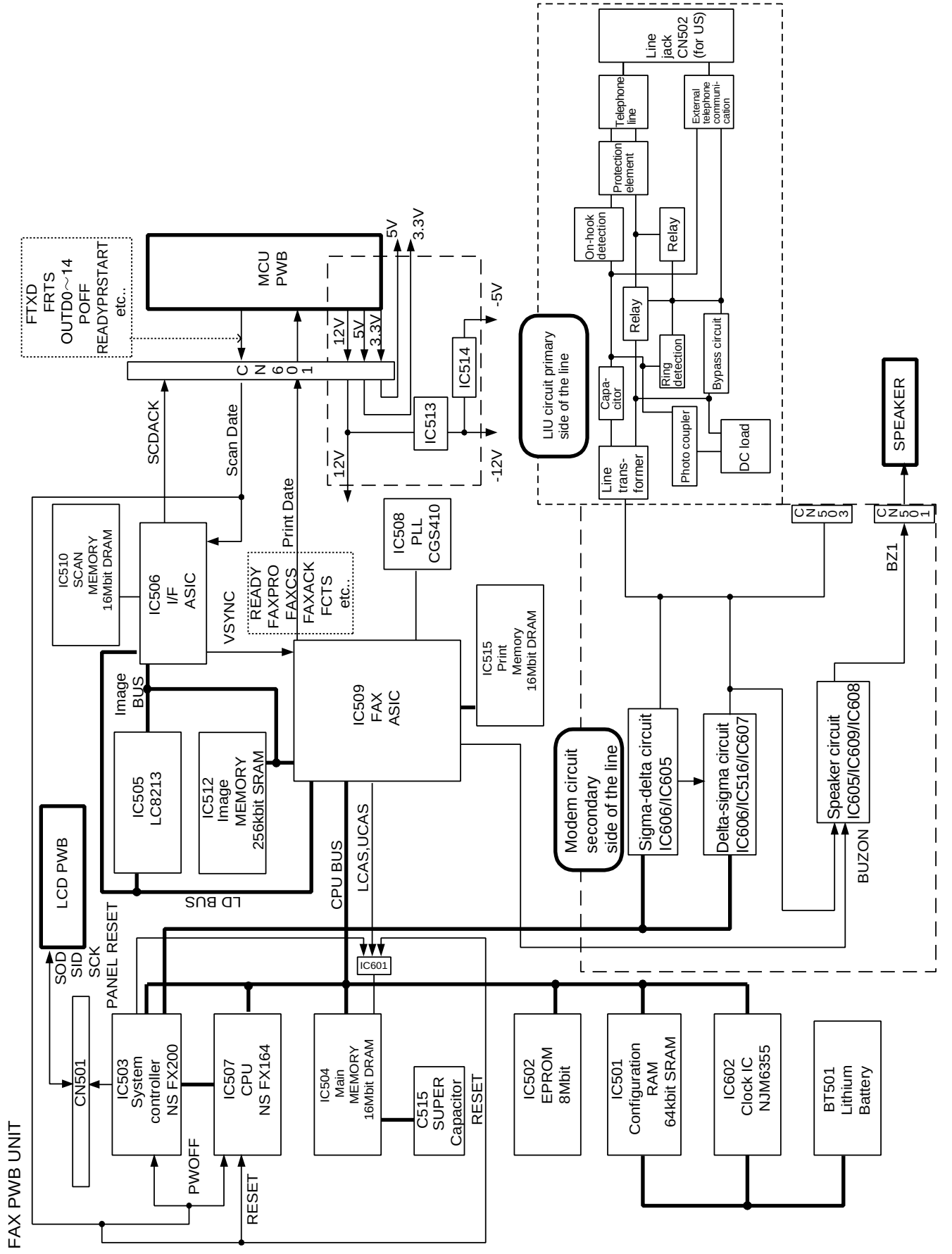
A. Overall block diagram



B. MCU PWB unit



C. FAX PWB unit (AR-F152 only)



2. Circuit descriptions

A. Man PWB (MCU)

(1) CPU signal table

PIN No.	Signal code	Input/output	Operating
1	/CS1	Output	Chip Select for SRAM
2	/CS0	Output	Chip Select for EPROM
3			D-GND
4			D-GND
5			5V
6	A0	Output	Address Bus (NC-pull up)
7	A1	Output	Address Bus
8	A2	Output	Address Bus
9	A3	Output	Address Bus
10			D-GND
11	A4	Output	Address Bus
12	A5	Output	Address Bus
13	A6	Output	Address Bus
14	A7	Output	Address Bus
15	A8	Output	Address Bus
16	A9	Output	Address Bus
17	A10	Output	Address Bus
18	A11	Output	Address Bus
19			D-GND
20	A12	Output	Address Bus
21	A13	Output	Address Bus
22	A14	Output	Address Bus
23	A15	Output	Address Bus
24	A16	Output	Address Bus
25	A17	Output	Address Bus
26	A18	Output	Address Bus
27	A19	Output	Address Bus (NC-pull up)
28			D-GND
29	A20	Output	Address Bus (NC-pull up)
30			NC-pull up
31	(SPPD)	Interruption level input	SPF Paper Pass Detector
32	USB-IN	Input	USB Connector-In Detect
33	(MHPS)	Interruption level input	Mirror Home Position Sensor
34	/CPU SYNC	Interruption level input	Horizontal Synchronous (from G/A)
35			D-GND
36			D-GND
37	ZC	Interruption level input	Zero-cross signal
38	/ASICINT	Interruption level input	Intterupt from G/A

PIN No.	Signal code	Input/output	Operating
39			5V
40	D0	Data input/output	Data Bus
41	D1	Data input/output	Data Bus
42	D2	Data input/output	Data Bus
43	D3	Data input/output	Data Bus
44			D-GND
45	D4	Data input/output	Data Bus
46	D5	Data input/output	Data Bus
47	D6	Data input/output	Data Bus
48	D7	Data input/output	Data Bus
49	D8	Data input/output	Data Bus
50	D9	Data input/output	Data Bus
51	D10	Data input/output	Data Bus
52	D11	Data input/output	Data Bus
53			D-GND
54	D12	Data input/output	Data Bus
55	D13	Data input/output	Data Bus
56	D14	Data input/output	Data Bus
57	D15	Data input/output	Data Bus
58			5V
59	(OP-DATA)	Output	Data Signal for Operation Panel
60	FTXD	Output	TXD for Additional Board
61	FRTS	Output	RTS for Additional Board
62	FRXD	Input	RXD for Additional Board
63	(OP-CLK)	Output	Clock for Operation Panel
64	TMON	Output	Power Supply Signal for Toner Motor Driver IC
65			D-GND
66	FCTS	Input	CTS for Additional Board
67			D-GND
68			D-GND

PIN No.	Signal code	Input/output	Operating
69	PSW	Input	Print switch input
70	KIN1	Input	Key input 1
71	KIN2	Input	Key input 2
72	TMCLK	Timer output	Clock for Toner Motor
73	/TMEN	Output	On-Off Control for Toner Motor
74	/POFF	Output	Power Off Signal for Additional Board
75	PMCLK	Timer output	Clock for Polygon Motor
76	/PRSTART	Output	Printing Start Signal
77	/SCANSP	Output	Scaning Stop Signal
78	/SCANST	Output	Scaning Start Signal
79	HL	Output (Timer output)	On-Off Control for Heatrer Lamp
80	WDTOVF-	Output	Watchdog Timer
81	RES-	Input	Reset
82		Input	pull up
83		Input	pull up
84			5V
85	XTAL		Clock
86	EXTAL		Clock
87			D-GND
88	CPUCLK	Output	System Clock for G/A
89			5V
90	/AS	Output	pull up
91	/RD	Output	Read Signal
92	/HWR	Output	Write Signal (High Address)
93	/LWR	Output	Write Signal (Low Address)
94	SELIN3	Output	Input select 3
95	SELIN2	Output	Input select 2
96	SELIN1	Output	Input select 1
97	PR	Output	Power relay control PR
98	RRS	Output	Resist roller solenoid RPC
99			D-GND
100			D-GND
101	SCLK	Output	Clock Line for EEPROM
102	SDA	Output	Data Line for EEPROM
103			A5V
104			Analog Reference Voltage-A5V
105	RTH	Analog input	Fusing Thermister
106			
107	SIN1	Input	Sensor input 1
108	SIN2	Input	Sensor input 2
109	SIN3	Input	Sensor input 3
110	SIN4	Input	Sensor input 4
111	DAH	Analog output	Reference Voltage (High) for CCD
112	DAL	Analog output	Reference Voltage (Low) for CCD
113			AN-GND
114			D-GND
115	DMT-3	Motor output	Duplex Motor Excitement
116	DMT-2	Motor output	Duplex Motor Excitement
117	DMT-1	Motor output	Duplex Motor Excitement
118	DMT-0	Motor output	Duplex Motor Excitement
119	MRMT3	Motor output	Mirror Motor Excitement
120	MRMT2	Motor output	Mirror Motor Excitement
121	MRMT1	Motor output	Mirror Motor Excitement
122	MRMT0	Motor output	Mirror Motor Excitement
123		Input	CPU MODE SET <MODE 4> - GND
124		Input	CPU MODE SET <MODE 4> - GND
125		Input	CPU MODE SET <MODE 4> - Vcc
126			NC-pull up
127	DRST	Input	Drum reset detection
128	/CS2	Output	Chip Select for ASIC

* The signals which are hatched are added or revised to or from the AL-1000.

(2) ASIC (Signal table)

PIN No.	Signal name	IN/OUT	Connected to	Description
1	/SCANSP	IN	CPU (I/O)	Scanner process interrupt signal
2	/PRSTART	IN	CPU	Print start trigger signal
3	/TMEN	IN	CPU	Toner motor ON/OFF
4	TMCLK	IN	CPU	Toner motor reference clock
5	3.3V	Power		
6	CPUAD7	IN	CPU	CPU address bus
7	CPUAD6	IN	CPU	CPU address bus
8	GND	Power		
9	CPUAD5	IN	CPU	CPU address bus
10	CPUAD4	IN	CPU	CPU address bus
11	CPUAD3	IN	CPU	CPU address bus
12	CPUAD2	IN	CPU	CPU address bus
13	CPUAD1	IN	CPU	CPU address bus
14	/CPUSYNC	OUT	CPU	Horizontal synchronization signal
15	/ASICINT	OUT	CPU	Interruption request signal
16	/CS2	IN	CPU	CPU chip select signal
17	/RESET	IN	RESET IC	Reset signal
18	5V	Power		
19	GND	Power		
20	3.3V	Power		
21	GND	Power		
22	MDATA15	IN/OUT	DRAM	Data bus of DRAM (page memory)
23	MDATA14	IN/OUT	DRAM	Data bus of DRAM (page memory)
24	MDATA13	IN/OUT	DRAM	Data bus of DRAM (page memory)
25	MDATA12	IN/OUT	DRAM	Data bus of DRAM (page memory)
26	MDATA11	IN/OUT	DRAM	Data bus of DRAM (page memory)
27	MDATA10	IN/OUT	DRAM	Data bus of DRAM (page memory)
28	MDATA9	IN/OUT	DRAM	Data bus of DRAM (page memory)
29	MDATA8	IN/OUT	DRAM	Data bus of DRAM (page memory)
30	MDATA7	IN/OUT	DRAM	Data bus of DRAM (page memory)
31	3.3V	Power		
32	MDATA6	IN/OUT	DRAM	Data bus of DRAM (page memory)
33	MDATA5	IN/OUT	DRAM	Data bus of DRAM (page memory)
34	GND	Power		
35	MDATA4	IN/OUT	DRAM	Data bus of DRAM (page memory)
36	MDATA3	IN/OUT	DRAM	Data bus of DRAM (page memory)
37	MDATA2	IN/OUT	DRAM	Data bus of DRAM (page memory)
38	MDATA1	IN/OUT	DRAM	Data bus of DRAM (page memory)
39	MDATA0	IN/OUT	DRAM	Data bus of DRAM (page memory)
40	/RAS0	OUT	DRAM	RAS signal 0 of DRAM (page memory)
41	/RAS1	OUT	DRAM	RAS signal 1 of DRAM (page memory)
42	/RAS2	OUT	DRAM	RAS signal 2 of DRAM (page memory)
43	/RAS64	OUT	DRAM control (for panther)	(Reserved)
44	3.3V	Power		
45	/RAS16	OUT	DRAM control (for panther)	(Reserved)
46	MAD0	OUT	DRAM	Address bus of DRAM (page memory)

PIN No.	Signal name	IN/OUT	Connected to	Description
47	GND	Power		
48	MAD1	OUT	DRAM	Address bus of DRAM (page memory)
49	MAD2	OUT	DRAM	Address bus of DRAM (page memory)
50	MAD3	OUT	DRAM	Address bus of DRAM (page memory)
51	MAD4	OUT	DRAM	Address bus of DRAM (page memory)
52	MAD5	OUT	DRAM	Address bus of DRAM (page memory)
53	MAD6	OUT	DRAM	Address bus of DRAM (page memory)
54	MAD7	OUT	DRAM	Address bus of DRAM (page memory)
55	MAD8	OUT	DRAM	Address bus of DRAM (page memory)
56	MAD9	OUT	DRAM	Address bus of DRAM (page memory)
57	3.3V	Power		
58	MAD10	OUT	DRAM	Address bus of DRAM (page memory)
59	MAD11	OUT	DRAM	Address bus of DRAM (page memory)
60	GND	Power		
61	/CAS0	OUT	DRAM	CAS signal of DRAM (page memory)
62	/CAS1	OUT	DRAM	CAS signal of DRAM (page memory)
63	/OE	OUT	DRAM	Read enable signal of DRAM (page memory)
64	/WE	OUT	DRAM	Write enable signal of DRAM (page memory)
65	OUTD0	OUT	FAX board data bus	Transmission data 0 to expanded board
66	OUTD1	OUT	FAX board data bus	Transmission data 1 to expanded board
67	OUTD2	OUT	FAX board data bus	Transmission data 2 to expanded board
68	OUTD3	OUT	FAX board data bus	Transmission data 3 to expanded board
69	3.3V	Power		
70	OUTD4	OUT	FAX board data bus	Transmission data 4 to expanded board
71	OUTD5	OUT	FAX board data bus	Transmission data 5 to expanded board
72	GND	Power		
73	OUTD6	OUT	FAX board data bus	Transmission data 6 to expanded board
74	OUTD7	OUT	FAX board data bus	Transmission data 7 to expanded board
75	OUTD8	OUT	FAX board data bus	Transmission data 8 to expanded board
76	OUTD9	OUT	FAX board data bus	Transmission data 9 to expanded board
77	OUTD10	OUT	FAX board data bus	Transmission data 10 to expanded board
78	OUTD11	OUT	FAX board data bus	Transmission data 11 to expanded board
79	OUTD12	OUT	FAX board data bus	Transmission data 12 to expanded board
80	OUTD13	OUT	FAX board data bus	Transmission data 13 to expanded board
81	OUTD14	OUT	FAX board data bus	Transmission data 14 to expanded board
82	OUTD15	OUT	FAX board data bus	Transmission data 15 to expanded board
83	/HSYNC	OUT	PCL, FAX board	Horizontal sync signal with print area output only
84	/PCLPRD	IN	PCL board	Print video data (serial) from PCL board
85	/PCLREQ	OUT	PCL board	DREQ signal to PCL board
86	/PCLACK	IN	PCL board	ACK signal from PCL board
87	/PCLCS	IN	PCL board	
88	3.3V	Power		
89	GND	Power		
90	5V	Power		
91	GND	Power		
92	/FAXPRD	IN	FAX board	Print video data (serial) from FAX board
93	/FAXREQ	OUT	FAX board	DREQ signal to FAX board
94	/FAXACK	IN	FAX board	ACK signal from FAX board
95	3.3V	Power		

PIN No.	Signal name	IN/OUT	Connected to	Description
96	/FAXCS	IN	FAX board	OUTD bus enable signal H bus impedance HIGH state
97	/ESPRD	IN	Electric sort board * (Reserved)	(Reserved)
98	GND	Power		
99	/ESREQ	OUT	Electric sort board * (Reserved)	(Reserved)
100	/ESACK	IN	Electric sort board * (Reserved)	(Reserved)
101	/ESCS	IN	Electric sort board * (Reserved)	(Reserved)
102	PARAD0	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
103	PARAD1	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
104	PARAD2	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
105	PARAD3	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
106	PARAD4	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
107	PARAD5	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
108	5V	Power		
109	PARAD6	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
110	PARAD7	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
111	GND	Power		
112	/REV	OUT	1284 board connector	ECP mode I/O select (LOW:P → H)
113	INIT	IN	1284 board connector	INIT signal (IEEE1284 communication port)
114	/SLCTIN	IN	1284 board connector	/SLCTIN signal (IEEE1284 communication port)
115	/AUTOFD	IN	1284 board connector	/AUTOFD signal (IEEE1284 communication port)
116	/STB	IN	1284 board connector	/STB signal (IEEE1284 communication port)
117	/ACK	OUT	1284 board connector	/ACK signal (IEEE1284 communication port)
118	BUSY	OUT	1284 board connector	BUSY signal (IEEE1284 communication port)
119	PE	OUT	1284 board connector	PE signal (IEEE1284 communication port)
120	/FAULT	OUT	1284 board connector	/FAULT signal (IEEE1284 communication port)
121	5V	Power		
122	SLCT	OUT	1284 board connector	/SLCTIN signal (IEEE1284 communication port)
123	/TESTPIN0	IN	TEST PIN	High: Normal Low: Test
124	GND	Power		
125	PFCLK	IN	Transmitter	Write clock
126	/TESTPIN1	IN	TEST PIN	High: Normal Low: Test
127	/SYNCEN	OUT	JITTER ADJUSTMENT IC	Jitter adjustment IC trigger signal
128	SD10	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
129	SD11	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
130	SD12	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
131	SD13	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
132	SD14	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
133	5V	Power		
134	SD15	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
135	SD16	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
136	GND	Power		
137	SD17	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
138	SOE1	OUT	SRAM (separation)	Read enable line to SRAM before area separation
139	SWE1	OUT	SRAM (separation)	Write enable line to SRAM before area separation
140	SCS1	OUT	SRAM (separation)	Chip select line to SRAM before area separation

PIN No.	Signal name	IN/OUT	Connected to	Description
141	SOE0	OUT	SRAM (separation)	Read enable line to SRAM before area separation
142	SWE0	OUT	SRAM (separation)	Write enable line to SRAM before area separation
143	SCS0	OUT	SRAM (separation)	Chip select line to SRAM before area separation
144	SD00	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
145	SD01	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
146	5V	Power		
147	SD02	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
148	SD03	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
149	GND	Power		
150	SD04	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
151	SD05	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
152	SD06	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
153	SD07	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
154	SAD0	OUT	SRAM (separation)	Address line to SRAM before area separation
155	SAD1	OUT	SRAM (separation)	Address line to SRAM before area separation
156	SAD2	OUT	SRAM (separation)	Address line to SRAM before area separation
157	SAD3	OUT	SRAM (separation)	Address line to SRAM before area separation
158	SAD4	OUT	SRAM (separation)	Address line to SRAM before area separation
159	SAD5	OUT	SRAM (separation)	Address line to SRAM before area separation
160	SAD6	OUT	SRAM (separation)	Address line to SRAM before area separation
161	SAD7	OUT	SRAM (separation)	Address line to SRAM before area separation
162	GND	Power		
163	SAD8	OUT	SRAM (separation)	Address line to SRAM before area separation
164	SAD9	OUT	SRAM (separation)	Address line to SRAM before area separation
165	SAD10	OUT	SRAM (separation)	Address line to SRAM before area separation
166	SAD11	OUT	SRAM (separation)	Address line to SRAM before area separation
167	SAD12	OUT	SRAM (separation)	Address line to SRAM before area separation
168	SAD13	OUT	SRAM (separation)	Address line to SRAM before area separation
169	/f1	OUT	CCD PWB	CCD drive signal transfer clock (First phase)
170	/f2	OUT	CCD PWB	CCD drive signal transfer clock (Second phase)
171	/SH	OUT	CCD PWB	CCD drive signal shift pulse
172	5V	Power		
173	RS	OUT	CCD PWB	CCD drive signal reset pulse
174	SP	OUT	CCD PWB	CCD drive signal sampling hold pulse
175	GND	Power		
176	CP	OUT	CCD PWB	A/D conversion IC latch clock
177	BCLK	OUT	CCD PWB	CCD shield output latch signal
178	IDIN0	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
179	IDIN1	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
180	IDIN2	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
181	IDIN3	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
182	IDIN4	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
183	IDIN5	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
184	IDIN6	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)

PIN No.	Signal name	IN/OUT	Connected to	Description
185	5V	Power		
186	IDIN7	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
187	/SDCLK	OUT	CHECK	Effective image area signal
188	GND	Power		
189	SFCLK	IN	Transmitter	CCD drive clock (48MHz), Also used as an internal clock.
190	TEST port 0	IN	AUTO SCAN TEST	High: Normal Low: Test
191	/SYNC	IN	LSU	Horizontal synchronization signal (HSYNC) from LSU
192	/LD	OUT	LSU	Laser drive signal
193	/LEND	OUT	LSU	Laser APC signal
194	USB-EN	OUT	GDI/USB PWB	USB port enable signal
195	1284-EN	OUT	GDI/USB PWB	1284 port enable signal
196	PORTOUT26	OUT		(Not used)
197	3.3V	Power		
198	PORTOUT25	OUT		(Not used)
199	PORTOUT24	OUT		(Not used)
200	GND	Power		
201	SGS	OUT	Tr array IC	SPF gate solenoid
202	SRRC	OUT	Tr array IC	SPF resist roller solenoid
203	SPUS	OUT	Tr array IC	SPF PU solenoid
204	/READY	OUT	FAX PWB	READY signal (Expansion PWB)
205	OP-LATCH	OUT	Tr array IC	Latch signal for operation circuit. Data latch at LOW.
206	MRPS2	OUT	Tr array IC	Mirror speed control signal. Mirror speed 2 at LOW.
207	MRPS1	OUT	Tr array IC	Mirror speed control signal. Mirror speed 1 at LOW.
208	SPFS	OUT	Tr array IC	SPF paper feed solenoid
209	SMSEL	OUT	Tr array IC	SPF motor/Mirror motor select signal
210	3.3V	Power		
211	TC	OUT	Tr array IC	Transfer charger control signal. ON at HIGH.
212	GRIDL	OUT	Tr array IC	Main charger grid control signal. ON at HIGH.
213	GND	Power		
214	MC	OUT	Tr array IC	Main charger control signal. ON at HIGH.
215	BIASL	OUT	Tr array IC	DV bias voltage control signal. ON at HIGH.
216	BIASH	OUT	Tr array IC	DV bias voltage control signal. ON at HIGH.
217	BIAS	OUT	Tr array IC	DV bias output control signal. ON at HIGH.
218	CL	OUT	Tr array IC	Copy lamp control signal. ON at HIGH.
219	VFMCNT	OUT	Tr array IC	Ventilation fan rotating speed control signal. Low speed at HIGH, high speed at LOW.
220	VFM	OUT	Tr array IC	Ventilation fan control signal. Fan ON at HIGH.
221	LDEN	OUT	Tr array IC	Laser circuit control signal. Laser circuit ON at HIGH.
222	PMD	OUT	Tr array IC	Polygon motor control signal. Polygon motor ON at HIGH.
223	5V	Power		
224	MM	OUT	Tr array IC	Main motor control signal. Main motor ON at HIGH.
225	MPFS	OUT	Tr array IC	Manual paper feed solenoid control signal. Multi paper feed ON at HIGH.
226	GND	Power		
227	CPFS2	OUT	Tr array IC	Second cassette paper feed solenoid control signal. Second cassette paper feed at HIGH.
228	CPFS1	OUT	Tr array IC	Cassette paper feed solenoid control signal. One-stage cassette paper feed at HIGH.
229	TM	OUT	Tr array IC	Toner motor drive output (+)

PIN No.	Signal name	IN/OUT	Connected to	Description
230	TM_	OUT	Tr array IC	Toner motor drive output (–)
231	CPUD15	IN/OUT	CPU	CPU data bus
232	CPUD14	IN/OUT	CPU	CPU data bus
233	CPUD13	IN/OUT	CPU	CPU data bus
234	CPUD12	IN/OUT	CPU	CPU data bus
235	CPUD11	IN/OUT	CPU	CPU data bus
236	5V	Power		
237	CPUD10	IN/OUT	CPU	CPU data bus
238	CPUD9	IN/OUT	CPU	CPU data bus
239	GND	Power		
240	CPUD8	IN/OUT	CPU	CPU data bus
241	CPUD7	IN/OUT	CPU	CPU data bus
242	CPUD6	IN/OUT	CPU	CPU data bus
243	CPUD5	IN/OUT	CPU	CPU data bus
244	CPUD4	IN/OUT	CPU	CPU data bus
245	CPUD3	IN/OUT	CPU	CPU data bus
246	CPUD2	IN/OUT	CPU	CPU data bus
247	CPUD1	IN/OUT	CPU	CPU data bus
248	CPUD0	IN/OUT	CPU	CPU data bus
249	3.3V	Power		
250	/CPUWR	IN	CPU	CPU write signal
251	/CPURD	IN	CPU	CPU read signal
252	GND	Power		
253	CPUCLK	IN	CPU	CPU system clock
254	GND	Power		
255	TEST PORT1	IN	AUTO SCAN TEST	High: Normal Low: Test
256	/SCANST	IN	CPU (I/O)	Scanner process start signal

∗ The signals which are hatched are added or revised to or from AL-1000.

(3) Expanded PWB interface section

The MCU PWB and the expanded PWB are connected by CN5 connector to make serial communication (UART).
The FAX PWB uses signals in Table A, and the PCL PWB uses signals in Table B.
Recognition of FAX PWB or PCL PWB:
If /FREADY is LOW, the FAX PWB expansion is recognized.
If /PREADY is LOW, the PCL PWB expansion is recognized.

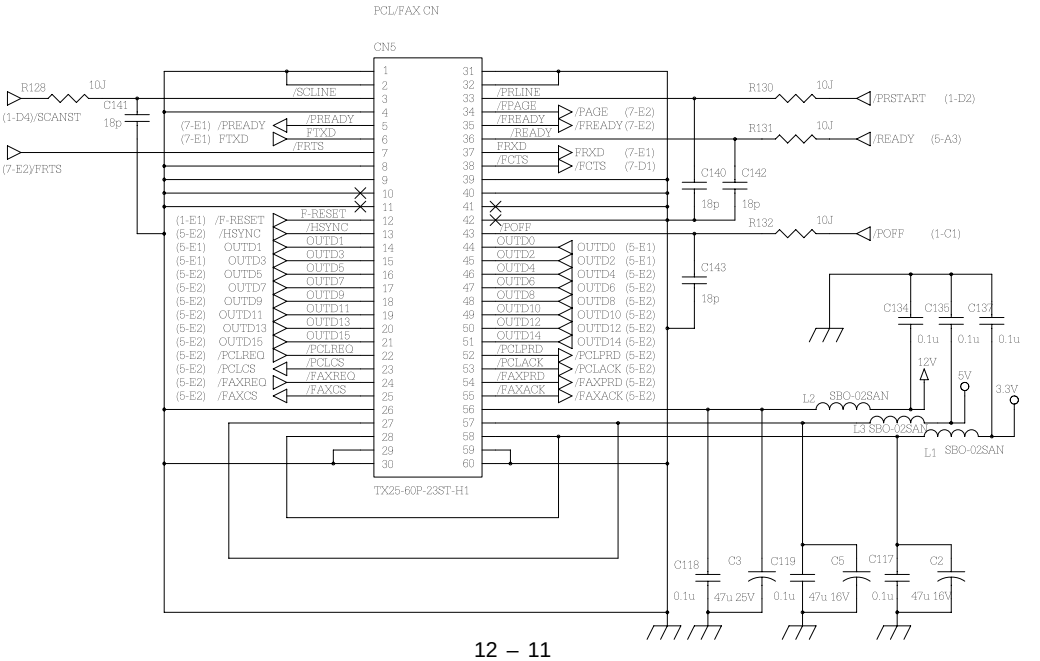


Table A (Signals used in the FAX PWB)

PIN No. (CN5)	Signal name	IN/OUT	Descriptions
3	/SCLINE	OUT	Effective input image area
6	FTXD	OUT	Serial communication data
7	/FRTS	OUT	Serial reception ready (Machine side)
12	/F-RESET	OUT	Reset signal
13	/HSYNC	OUT	Horizontal sync signal
14 ~ 21, 44 ~ 51	OUTD1 ~ OUTD15	OUT	Data to the expanded PWB
24	/FAXREQ	OUT	Data transfer REQ signal
25	/FAXCS	IN	OUTD bus enable signal
33	/PRLINE	OUT	Effective print area
34	/FPAGE	IN	Page data READY
35	/FREADY	IN	FAX PWB recognition signal
36	/READY	OUT	READY signal on the machine side
37	FRXD	IN	Serial communication data
38	/FCTS	IN	Serial reception READY (FAX side)
43	/POFF	OUT	Power OFF signal
54	/FAXPRD	IN	Video data from FAX PWB
55	/FAXACK	IN	Data transfer ACK signal

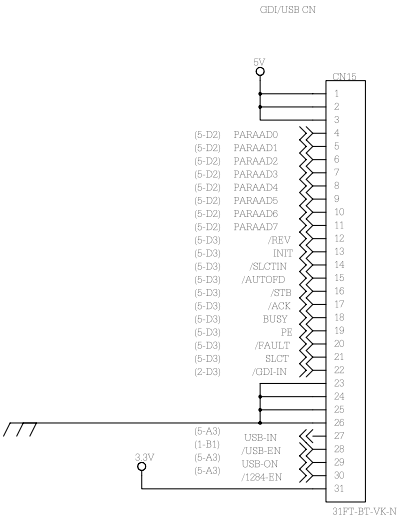
Table B (Signals used in PCL PWB)

PIN No. (CN5)	Signal name	IN/OUT	Descriptions
5	/PREADY	IN	PCL PWB recognition signal
6	FTXD	OUT	Serial communication data
7	/FRTS	OUT	Serial reception READY (Machine side)
12	/F-RESET	OUT	Reset signal
13	/HSYNC	OUT	Horizontal sync signal
34	/FPAGE	IN	Page data READY
36	/READY	OUT	READY signal on the machine side
37	FRXD	IN	Serial communication data
38	/FCTS	IN	Serial reception READY (PCL side)
52	/PCLPRD	IN	Video data from PCL PWB

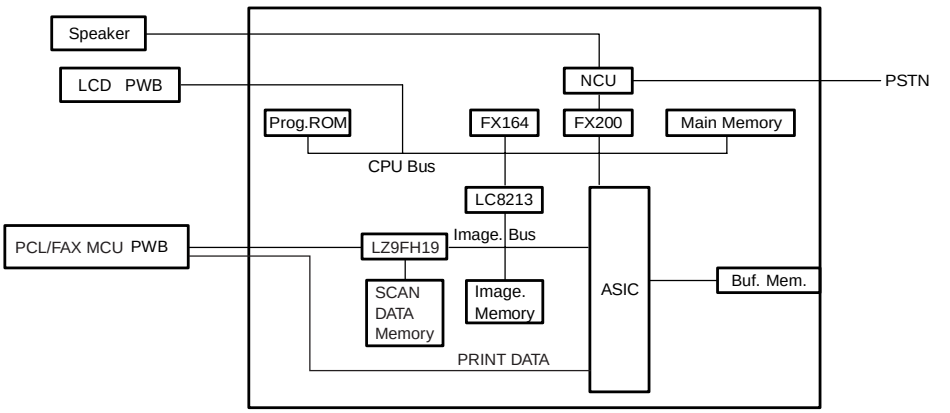
(4) 1284/USB circuit select control section

The GDI/USB PWB is connected to CN15 connector to control switching between IEEE1284 port and USB port.
If USB cable isn't connected to the GDI/USB PWB, the /1284-EN signal becomes LOW to allow the user of IEEE1284 port.

If USB cable is connected, the /USB-EN signal becomes LOW to allow the use of USB port.
Since USB has priority, when USB cable is connected, it is selected. That is, when USB cable is connected, IEEE1284 port (parallel port) is disabled.



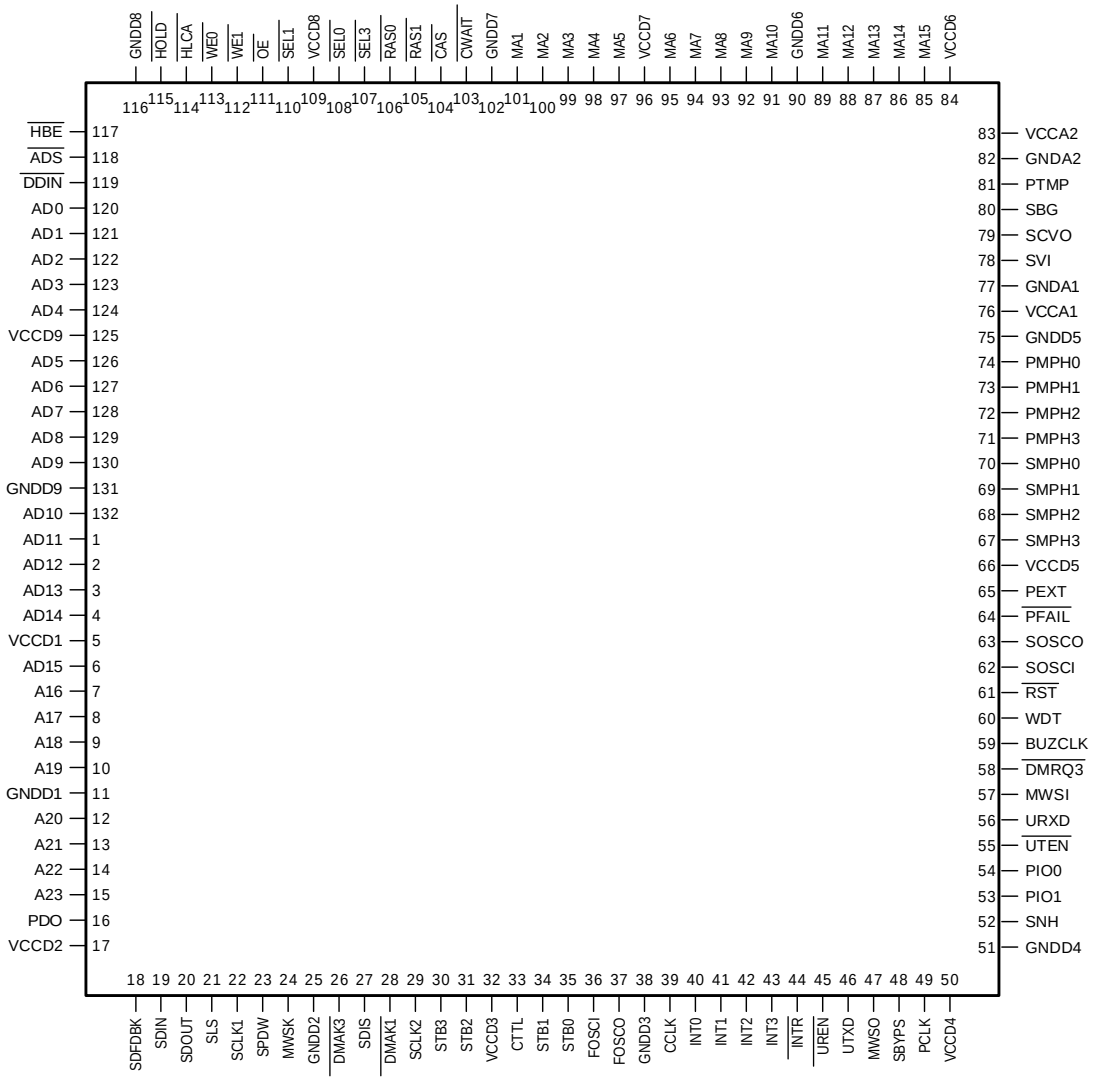
3. FAX PWB Functional block diagram (AR-F152 only)



4. LSI pin layout (AR-F152 only)

(1) NSFX200 (IC503) pin layout

132-Pin FQFP Package



TL/EE/11331-54

NSFX200 (IC503) supplies

Signal	Pin Numbers	Descrlption
GNDA1 ~ 2	77 82	**Analog ground.**
GNDD1 ~ 9	11 25 38 51 75 90 102 116 131	**Digital ground.**
VCCA1 ~ 2	76 83	**Analog Power —** 5V supply for analog circuits.
VCCD1 ~ 9	5 17 32 50 66 84 96 109 125	**Digital Power —** 5V supply for digital circuits.

Input Signals

Signal	Pin Numbers	Description
CTTL	33	**CPU Clock —** CPU clock that is used for clocking the NS32FX200.
$\overline{\text{DMRQ3}}$	58	**DMA Request —** Input for DMA channel 3 request.
FOSCI	36	**High-Speed Oscillator —** (49.1520 MHz) Asynchronous. When an external oscillator is used, FOSCO should be left unconnected or loaded with no more than 5 pF of stray capacitance.
$\overline{\text{HBE}}$	117	**High Byte Enable —** Status signal used to enable data transfers on the most significant byte of the data bus.
$\overline{\text{HLDA}}$	114	**Hold Acknowledge —** Issued by the CPU to indicate it has released the bus in response to a HOLD request.
INT0 ~ 3	40 41 42 43	**Interrupt In —** Asynchronous. External maskable prioritized interrupt requests.
MWSI	57	**General purpose input pin.**
$\overline{\text{PFAIL}}$	64	**Power Fall Indication —** An asynchronous signal which forces the NS32FX 200 into freeze mode.
PTMP	81	Not used.
$\overline{\text{RST}}$	61	**Reset In —** Asynhronous reset input from the CPU.
SBG	80	Not used.
SDIN	19	**Sigma-Delta Data In —** Asynchronous input from the SDC analog receiver.
SOSCI	62	**Low-Speed Oscillator —** (3.2768 kHz or 455 kHz) Asynchronous. When an external oscillator is used, SOSCO should be left unconnected or loaded with no more than 5 pF of stray capacitance.
SVI	78	**Scanner Video In —** Analog current from the scanner sample and hold circuit.
URXD	56	**UART Recelve —** Asynchronous input or general purpose input pin.
$\overline{\text{UTEN}}$	55	General purpose input pin.

Output Signals

Signal	Pin Numbers	Description
BUZCLK	59	**Buzzer Clock —** Programmable frequency clock for the buzzer.
$\overline{\text{CAS}}$	104	**DRAM Column Address Strobe —** Column address strobe for DRAM banks refresh.
CCLK	39	**CPU Double Clock —** Feeds CPU'S OSCIN. Asynchronous.
$\overline{\text{CWAIT}}$	103	**Continuous Walt —** Low extends the memory cycle of the CPU.
$\overline{\text{DMAK1}}$	28	**General purpose output pin.**
$\overline{\text{DMAK3}}$	26	**DMA Acknowledge —** Output for DMA channel 3 acknowledge or general purpose output pin.
FOSCO	37	**High-Speed Oscillator Out —** Asynchronous.This line is used as the return path for the crystal (if used).
HOLD	115	**Hold Request —** When low, HOLD requests the bus from the CPU to perform DMA operations or to insert idle bus cycles.
INTR	44	**Interrupt Request —** Low indicates that an interrupt request is being output to the CPU.
MA1 ~ 15	101 100 99 98 97 95 94 93 92 91 89 88 87 86 85	**Memory Address Bus —** Multiplexed DRAM address.
MWSK	24	**General purpose output pin.**
$\overline{\text{OE}}$	111	**Output Enable —** Used by the addressed device to gate the data onto the data bus.
PDO	16	Not used.
PEXT	65	Not used.
PMPH0 ~ 3	74 73 72 71	**Output port.**
$\overline{\text{RAS0}}$	106	**DRAM Row Address Strobes —** Row address strobe for DRAM banks 0 and 1.
$\overline{\text{RAS1}}$	105	**RAS1 is not used.**
SCLK1	22	**General purpose output pin.**
SCLK2/$\overline{\text{DAMK0}}$	29	**Scanner Clock 2 —** Output, DMA Acknowledge-output for DMA channel 0 acknowledge.
SCVO	79	**Scanner Compensated Video Out —** Analog current for use by ABC or optional video enhanement circuit.
SDFDBK	18	**Sigma-Delta Feedback —** Feedback input to the SDC analog receiver. Asynchronous output signal.

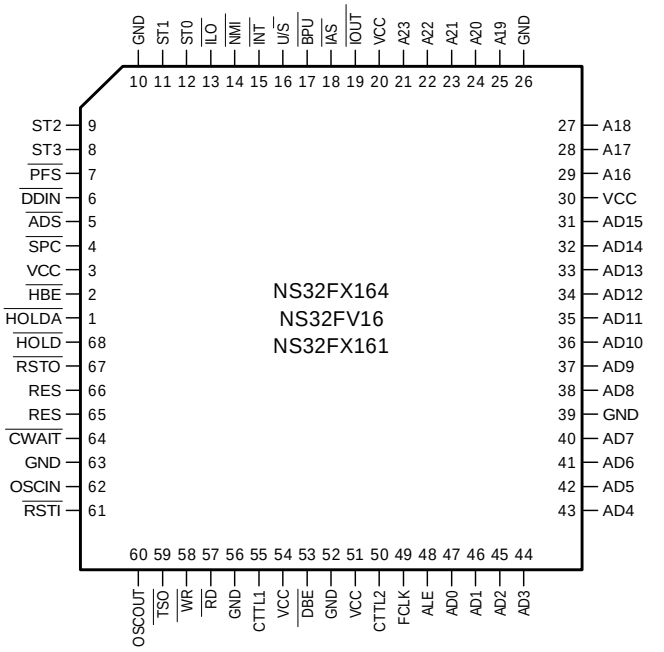
Signal	Pin Numbers	Description
SDIS/$\overline{\text{DMAK2}}$	27	General purpose output pin.
SDOUT	20	**Sigma-Delta Data Out —** Input to the SDC analog transmitter.
$\overline{\text{SEL0}}$	108	**Zone Select —** Used to adderss the device according to the selected zone.
$\overline{\text{SEL1}}$	110	
$\overline{\text{SEL3}}$	107	
SLS	21	General purpose output pin.
SMPH0 ~ 3	70 69 68 67	**Output port.**
SOSCO	63	**Low-Speed Oscillator Out —** Asynchronous. This line is used as the return path for the crystal (if used).
SPDW	23	**General purpose output pin.**
STB0-3	35 34 31 30	**General purpose output pin.**
WDT	60	**WATCHDOG Trap —** Traps CPU execution when WATCHDOG detects error.
$\overline{\text{WEO}}$	113	**Write Enable —** Used by the addressed device to get the data from the data bus.$\overline{\text{WE0}}$ for even and $\overline{\text{WE1}}$ for odd bytes.
$\overline{\text{WE1}}$	112	

Input/Output Signals

Signal	Pin Numbers	Description
A16 ~ 23	7 8 9 10 12 13 14 15	**High Order Address Bus —** The most significant eight bits of the CPU address bus.
AD0 ~ 15	120 121 122 123 124 126 127 128 129 130 132 1 2 3 4 6	**Address/Data bus —** Multiplexed address/data information.
$\overline{\text{ADS}}$	118	**Address Strobe —** Controls memory access, and signals the beginning of a bus cycle.
$\overline{\text{DDIN}}$	119	**Data Direction In —** Indicates the direction of data transfer during a bus cycle.
MWSO	47	**General purpose I/O pin.**
PCLK/$\overline{\text{DMRQ1}}$	49	**General purpose I/O pin.**
PIO0-1	54 53	**General Purpose I/O Pins.**
SBYPS/$\overline{\text{DMRQ2}}$	48	**General purpose I/O pin.**
SNH/$\overline{\text{DMRQ0}}$	52	**Sample and Hold —** Output to scanner sample and hold circuit or DMA Request-input for DMA channel 0 reques.
$\overline{\text{UREN}}$	45	**General purpose I/O pin.**
UTXD	46	**UART Transmit —** Output.

(2) NS32FX164 (IC507)

68-Pin PCC Package



Supplies

V_{CC} **Power**
+5 V positive supply.

GND **Ground.**
Ground reference for both on-chip logic and output drivers.

Input Signals

$\overline{\text{RSTI}}$ **Reset Input.**
Schmitt triggered, asynchronous signal used to generate a CPU reset.
Note: The reset signal is a true asynchronous input. Therefore, no external synchronizing circuit is needed.

$\overline{\text{HOLD}}$ **Hold Request.**
When active, causes the CPU to release the bus for DMA or multiprocessing purposes.
Note: If the $\overline{\text{HOLD}}$ signal is generated asynchronously, its set up and hold times may be violated. In this case, it is recommended to synchronize it with CTTL to minimize the possibility of metastable states.The CPU provides only one synchronization stage to minimize the $\overline{\text{HLDA}}$ latency. This is to avoid speed degradations in cases of heavy $\overline{\text{HOLD}}$ activity (i.e., DMA controller cycles interleaved with CPU cycles).

$\overline{\text{INT}}$ **Interrupt.**
A low level on this pin requests a maskable interrupt. INT must be kept asserted until the interrupt is acknowledged.

$\overline{\text{NMI}}$ **Non-Maskable Interrupt.**
A High-to-Low transition on this signal requests a non-maskable interrupt.
Note: $\overline{\text{INT}}$ and $\overline{\text{NMI}}$ are true asynchronous inputs. Therefore, no external synchronizing circuit is needed.

$\overline{\text{CWAIT}}$ **Continuous Walt.**
Causes the CPU to insert continuous wait states if sampled low at the end of T2 and each following T-State.

OSCIN **Crystal/External Clock Input.**
Input from a crystal or an external clock source.

Output Signals

A16 ~ A23 * **High-Order Address Bits.**
These are the most significant 8 bits of the memory address bus.

$\overline{\text{HBE}}$ * **High Byte Enable.**
Status signal used to enable data transfers on the most significant byte of the data bus.

ST0 ~ 3 **Status.**
Not used.

U/$\overline{\text{S}}$ **User/Supervisor.**
Not used.

$\overline{\text{ILO}}$ **Interlocked Operation.**
Not used.

$\overline{\text{HLDA}}$ **Hold Acknowledge.**
Activated by the CPU in response to the $\overline{\text{HOLD}}$ input to indicate CPU has released the bus.

$\overline{\text{PFS}}$ **Program Flow Status.**
A pulse on this signal indicates the beginning of execution of instruction.

$\overline{\text{BPU}}$ **BPU Cycle.**
Not used.

$\overline{\text{RSTO}}$ **Reset Output.**
This signal becomes active when $\overline{\text{RSTI}}$ is low, initiating a system reset.

$\overline{\text{RD}}$ **Read Strobe.**
Activated during CPU or DMA read cycles to enable reading of data from memory or peripherals.

$\overline{\text{WR}}$ **Write Strobe.**
Activated during CPU or DMA write cycles to enable writing of data to memory or peripherals.

$\overline{\text{TSO}}$ **Timing State Output.**
Not used.

$\overline{\text{DBE}}$ **Data Buffers Enable.**
Used to control external data buffers. It is active when the data buffers are to be enabled.

OSCOUT **Crystal Output.**
Not used.

$\overline{\text{IAS}}$ **SPecial Cycle Address Strobe.**
Not used.

CTTL1 – 2 **System Clock.**
Output clock for bus timing. CTTL1 and CTTL2 must be externally connected together.

FCLK **Fast Clock.**
Not used.

ALE **Address Latch Enable.**
Active high signal that can be used to control external address latches.

$\overline{\text{IOUT}}$ **Interrupt Output**
Not used.

Input-Output Signals

AD0 ~ 15 * **Address/Data Bus.**
Multiplexed Address/Data Information. Bit 0 is the least significant bit of each.

$\overline{\text{SPC}}$ **Slave Processor Control.**
Not used.

$\overline{\text{DDIN}}$ * **Data Direction.**
Status signal indicating the direction of the data transfer during a bus cycle. During $\overline{\text{HOLD}}$ acknowledge this signal becomes an input and determines the activation of $\overline{\text{RD}}$ or $\overline{\text{WR}}$.

$\overline{\text{ADS}}$ * **Address Strobe**
Controls address latches; signals the beginning of a bus cycle. During $\overline{\text{HOLD}}$ acknowledge this signal becomes an input and the CPU monitors it to detect the beginning of a DMA cycle and generate the relevant strobe signals. When a DMA is used, $\overline{\text{ADS}}$ should be pulled up to V_{CC} through a 10 kΩ resistor.

(3) LC8213K (IC505) Pin Layout

I: Input pin
O: Output pin
B: Bidirectional pin
P: Power pin
NC: Not connected

No.	Pin name	Type
1	$\overline{\text{CS}}$	I
2	$\overline{\text{RD}}$	I
3	WR	I
4	A2	I
5	A1	I
6	A0	I
7	V_{DD}	P
8		NC
9	D7	B
10	D6	B
11	D5	B
12	D4	B
13	V_{SS}	P
14	D3	B
15	D2	B
16	D1	B
17	D0	B
18		NC
19		NC
20	IREQ	O
21	DREQ	O
22	$\overline{\text{DACK}}$	I
23		NC
24		NC
25		NC
26		NC
27	$\overline{\text{RESET}}$	I
28	CLK	I
29	V_{SS}	P
30	TEST4	I
31	V_{DD}	P
32	TEST3	I
33	TEST2	I
34	TEST1	I
35	TEST0	I
36		NC
37	BREQ	O
38	$\overline{\text{BACK}}$	I
39	IDREQ	I
40	$\overline{\text{IDACK}}$	O

No.	Pin name	Type
41	$\overline{\text{AEN}}$	O
42	AST	O
43	$\overline{\text{MDEN}}$	O
44	$\overline{\text{MRD}}$	O
45	$\overline{\text{MWR}}$	O
46	$\overline{\text{IORD}}$	O
47	$\overline{\text{IOWR}}$	O
48	$\overline{\text{LDE}}$	O
49	$\overline{\text{UDE}}$	O
50	READY	I
51	DTC	O
52	V_{SS}	P
53		NC
54	MA23	O
55	MA22	O
56	MA21	O
57	MA20	O
58	MA19	O
59	MA18	O
60	MA17	O
61	MA16	O
62	MA/MD15	O
63	V_{SS}	P
64	MA/MD14	B
65	MA/MD13	B
66	MA/MD12	B
67	MA/MD11	B
68	MA/MD10	B
69	MA/MD9	B
70	MA/MD8	B
71	MA/MD7	B
72	V_{SS}	P
73	V_{DD}	P
74	MA/MD6	B
75	MA/MD5	B
76	MA/MD4	B
77	MA/MD3	B
78	MA/MD2	B
79	MA/MD1	B
80	MA/MD0	B

(4) CPU interface

Terminal name	Pin No.	I/O	Function
$\overline{CS}$	1	I	Chip select for the CPU to access the LC8213 (low sctive).
$\overline{RD}$	2	I	Read.Set to “L” when the CPU is the read out the LC8213 register.
$\overline{WR}$	3	I	Write.Set to “L” when the CPU is to the LC8213 register.
A2 A1 A0	4 5 6	I	Address input for when the CPU accesses LC8213.
D7 D6 D5 D4 D3 D2 D1 D0	9 10 11 12 14 15 16 17	I/O 3 state	Bidirectional 8-bit data bus
IREQ	20	O	Interrupt request signal for the CPU. By reading out the INTR (interrupt request register) the CPU can find the cause of the interruption.IREQ is set to “L” when the CPU reads INTR.
DREQ	21	O	DMA request signal for the external DMA controller. This will be set to “H” in the following cases. • Data exists in the EFIFO during the coding processes. • An empty space exists in the DFIFO during decoding processes. • The DBUF can read/write during data transfer between the image memory bus and CPU bus.
$\overline{DACK}$	22	I	DMA acknowledge signal from the external DMA comtroller.If $\overline{DACK}$ is set to “L” during coding or decoding, EFIFO and DFIFO will be accessed. DBUF will be accessed if $\overline{DACK}$ is set to “L” during data transfer between the image memory bus and CPU bus.

(5) Image memory interface

Terminal name	Pin No.	I/O	Function
MA23 MA22 MA21 MA20 MA19 MA18 MA17 MA16	54 55 56 57 56 59 60 61	O 3 state	Not used.
MA/MD15 MA/MD14 MA/MD13 MA/MD12 MA/MD11 MA/MD10 MA/MD9 MA/MD8	62 64 65 66 67 68 69 70	I/O 3 state	Not used. Low-order 16-bit address and 16-bit data bus for the image memory.
MA/MD7 MA/MD6 MA/MD5 MA/MD4 MA/MD3 MA/MD2 MA/MD1 MA/MD0	71 74 75 76 77 78 79 80		
$\overline{AEN}$	41	O	This is set to “L” when the LC8213 is the bus master to the image memory. If AEN = “H”, MA/MD, $\overline{MRD}$, $\overline{MWR}$, $\overline{IORD}$, $\overline{IOWR}$, $\overline{UDE}$ and $\overline{LDE}$ will be a HiZ output.
AST	42	O	This signal indicates that an address is being output to MA/MD15 ~ MA/MD0.
$\overline{MDEN}$	43	O	This signal indicates that the LC8213 is using MA/MD15 ~ MD0 as data buses.
$\overline{USE}$	49	I/O 3 state	Not used.
$\overline{LDE}$	48	I/O 3 state	This signal indicates that the low-order bits of the data bus are being used.
$\overline{MRD}$	44	O 3 state	This is set to “L” when data is being read out of the image memory.
$\overline{MWR}$	45	O 3 state	This is set to “L” when data is being written into the image memory.
$\overline{IORD}$	46	O 3 state	Not used.
$\overline{IOWR}$	47	O 3 state	Not used.
BREQ	37	O	This signal is used for the LC8213 to request usage rights from the image memory bus.
$\overline{BACK}$	38	I	Input signal allowing the LC8213 to use the image memory bus.
IDREQ	39	I	Not used.
$\overline{IDACK}$	40	O	Not used.
READY	50	I	This signal is used to delay the read/write signal when using low speed image memory or an I/O device.
DTC	51	O	Not used.

(6) Others

Terminal name	Pin No.	I/O	Function
CKL	28	I	External clock (Max.20NHz)
$\overline{RESET}$	27	I	Reset
TEST0 TEST1 TEST2 TEST3 TEST4	35 34 33 32 30	I	For testing.This is normally fixed to “L”.
V_{DD}	7, 31, 73		power supply (+ 5V)
V_{SS}	13, 29, 52, 63, 72		GND

(7) MBCG46533-175 (IC 509) Pin Loyout

Pin#	Signal	Description
1:18	IA14:IA0	Image bus address
19	AI_LINEINT	Scanner line interuppt to FX200 INT1 pin
20	CEP_*LED	Chip select to image memory
21	AI_TRIG	Tigger signal to LC82103
22	AI_*IPDACK	DMA ack. sugnal to LC82103
23	IM_*WR	Write strobe to image memory
24	AI_CEP*DREQ	DMA request to FX200
25	AI_BACK	Bus ack.signal to LC8213
28	IP_CLK1	CLK1 of the LC82103
32	AI_*CEPDMAK	DMA ack.signal from FX200
33	IM_IPDREQ	DMA request from LC82103
34: 42	IDATA7: IDATA0	Image bus data
44	IM_IPSH	SH signal from LC82103
45	IM_BREQ	Bus request from LC8213
46	CEP_DREQ	DMA request from LC8213
47	CEP_*AEN	Address enable signal from LC8213
48	CEP_AST	Address strobe signal from LC8213
49	*RESET	Reset signal from LBP engine
51	VCKL	Not used
53	*DREADY	DREADY signal from LBP
54	ERROR	ERROR signal from LBP
55	*DCRDY	DCRDY signal from LBP
56	*HSYNC	Horizontal syc.signal from LBP
57	*SCLK	SCLK signal from LBP
58	VSYNC	Vertical signal from LBP
59	PLL-CLK	Basic clock from PLL
62	*DDATA	Video data to LBP
63	*DSRDY	DSRDY signal from LBP
64	*SDATA	SDATA for LBP
65	RES-*ERR	RESERR to LBP
66	*DPAGE	DPAGE to LBP
67	*DPRIM	DPRIM to LBP
69	AI-*MWE	Write strobe to 16MDRAM
70	AI-*ICAS	L-CAS signal to 16MDRAM
71	AI-*UCAS	U-CAS signal to 16MDRAM
73	*ICAS	CAS signal from FX200
74	*IWEI	Write enable signal for even byte on data bus
75	*IWE0	Write enable signal for odd byte on data bus
76	FX1_*RSTO	Reset signal from FX164
77	AI_*IRD	read strobe to I/O device
78	AI_*IWR	write strobe to I/O device
80	AI_*SANWRL	Strobe signal for LD0:8 bus
81:89	LD0:LD7	Buffered AD bus for slow devices access
90	AI_*CSIP	Chip select signal for LC82103
91	AI_*CSCEP	Chip select signal for LC8213
92	AI_*RDKRB	Read strobe signal for 74LS244
93	AI_*FIFOA9	WPSFIFO address signal
94	AI_*CSCONF	Chip select signal for 64KSRAM
95	AI_*WRLED	Not used
98	F2_*SEL1	Zone select signal from FX200,
99	F2_*SEL3	Zone select signal from FX200
100	F2_*DMAK0	DMA ask.signal from FX200
101	F1_*DBE	Data buffer enable signal from FX164
102	F1_*DDIN	Status signal indicating the direction of the data bus from FX164
103	F1_*RD	Read strobe signal from FX164
104	F1_*WR	Write strobe signal from FX164
108	F1_CTTL1	System clock from FX164
110	F1_*HLDA	Hold Ask. signal from FX164
111	F1_ALE	Address latch signal from FX164
112:129	AD15:AD0	FX164 AD bus
132	*XINT	1284 INT signal
133	XSELECT	1284 SELECT signal
134	XPERR	1284 PERR signal
135	XBUSY	1284 Busy signal
136	XACK	1284 ACK signal
137	XFAULT	1284 FAUL signal
138:146	BPCDATA1:BPCDATA8	1284 buffered data
148	*XSTROBE	1284 STROBE signal
149	*XSLECTION	1284 SELECT IN signal
150	*XAUTOFD	1284 AUTOFD signal
151	AI_1284IN	1284 buffer direction control signal
152	AI_ECPINT	1284 interrupt signal to FX200
153	AI_*DREQ	
155	XTST	TEST pin
156	SW4M	FIFO RAM size select signal
157:174	AI_FIFOD0: AI_FIFOD15	WIPS FIFO Data
175	AI_FIFO*WR	WPS FIFO write strobe
177	AI_FIFO*CAS	WPS FIFO CAS signal
178	AI_FIFO*RAS	WPS FIFO RAS signal
179:188	AI_FIFOA0:AI_FIFOA8	WPS FIFO address signal
190:193	AI_SMPH0:AI_SMPH3	Scanner motor phase signal
194:195	AI_CUR0:AI_CUR1	Scanner motor current control signal
197	AI_*CLK2	CLK2 signal for CCD
198	AI_*CLK1	CLK1 signal for CCD
199	AI_*CLAMP	CLAMP signal for CCD
202	AI_*LAMPON	Scanner lamp control signal
203	AI_*TGCCD	TG signal for CCD
204	AI_*RSCCD	RS signal for CCD
205	PNL_*SCOVER	Scanner cover open signal
206	*B4SEN	B4 sensor signal (Not used in not-Japan model)
207	*PISEN	Paper in Sensor on Scanner signal
208	*ORSEN	Original sensor on scanner signal

5. FAX PWB circuit description (AR-F152 only)

(1) Summary

The FAX PWB performs the following operations:

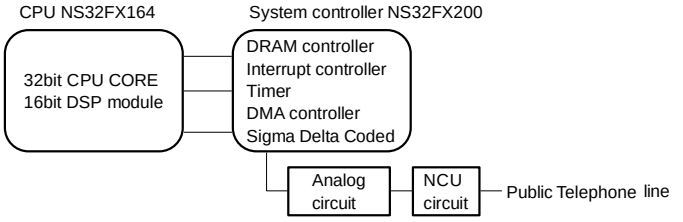
- Interface with the MCU PWB (Scan data input, print image data output)
- FAX operation panel control
- FAX image conversion
- Interface with the public telephone line

NS FX164 is used as the CPU, and FX200 is used as the system controller. An 8M OTPROM is used as the program ROM, and16M DRAM as the main memory. To store the registered telephone numbers, etc., 64K SRAM (backed up by battery) and the clock IC are used.

LC8213 is used to perform data compression and expansion.
ASIC performs laser printer control and interface with and the MCU PWB.
The NCU circuit connects with the telephone line.

(2) CPU section

The NS32FX164 (having 32bit core and 16bit DSP core) is used as the CPU in combination with the system controller NS32FX200. The 32bit CPU core is used to control the system. By combination with the 16bit DSP core and the Sigma Delta Coded circuit in the NS32FX200, the MODEM function is realized. The NS32FX200 is provided with the DRAM controller function, the interrupt controller function, the timer function, and the DMA controller function, which are used to control the system.



(3) Memory

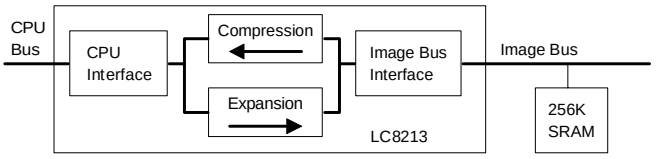
A DRAM of 16M (1M × 16 bit composition) is used as the main memory. An 8M OPTROM (512K × 16 bit composition) is used as the program memory.
The NJU6355 is used as the clock IC, and 64K SRAM of 8K × 8bit is used as the configuration memory which stores various settings. These two IC's are backed up by a 3V lithium battery even when the AC power is turned off. The configuration memory is also used as the buffer memory in PC-FAX.

(4) Scanner image storing process

ASIC (LZ9FH19) receives scanner image data processed in the MCU PWB and stores in the scan data memory.
ASIC outputs image data to the image data bus and performs compression and expansion with LC8213 according to the CPU's instruction.

(5) Compression, expansion

By combination of LC8213 and 256K SRAM, compression and expansion are performed.



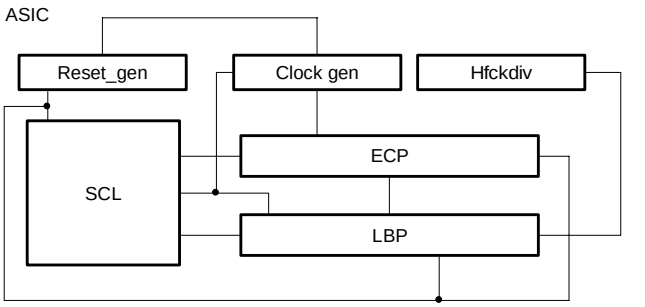
This IC converts bit map data into coded data in MH, MR, or MMR format or converts coded data of MH, MR, or MMR format into bit map data. In FAX sending, bit map data is outputted from LZ9FH19 to the image bus are coded in MMR format and outputted to the CPU bus. The coded data are stored in the main memory. In FAX reception, the coded data are read from the main memory and converted into bit map data by this IC and outputted to the image bus.
The outputted data are sent through the ASIC to the MCU PWB and printed. The 256K SRAM connected to the image bus are used as the buffer memory.

(6) ASIC section

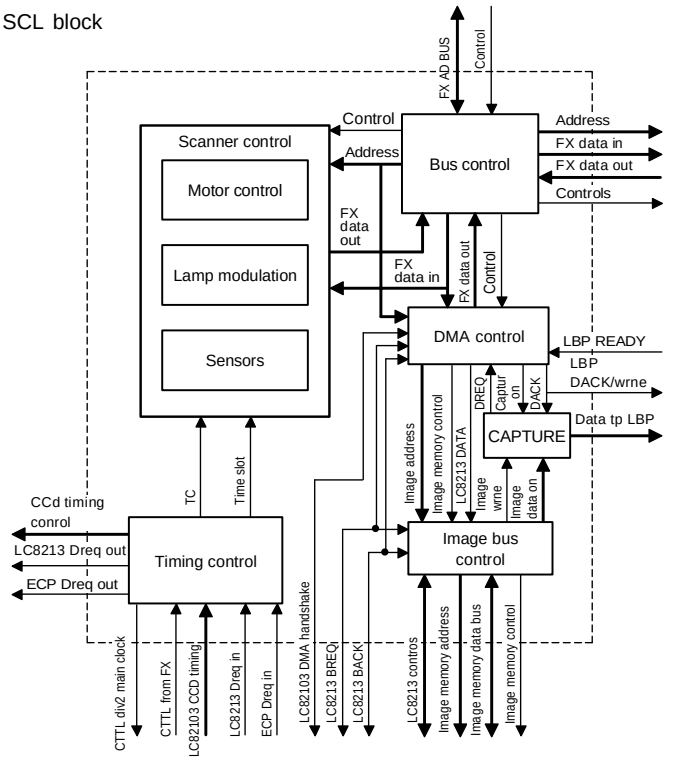
This ASIC of about 30,000 gates is composed of the three blocks.

- SCL block: Scanner control and bus control
- 1284 block: Interface section with PC
- LBP: Laser printer engine control and FIFO memory control

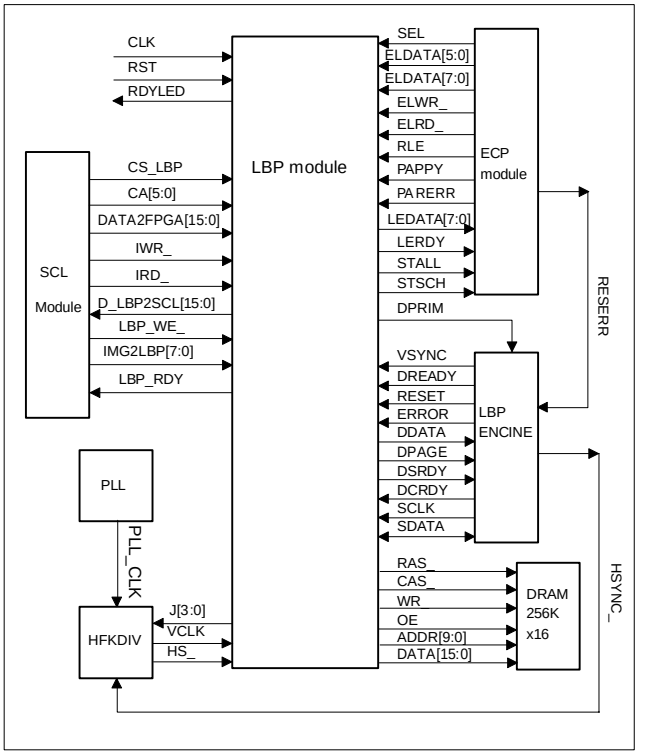
RESET_GEN forms reset signals in ASIC, and CLOCK GEN forms clock signals in ASIC. HFKDIV divides the basic video frequency inputted to the ASIC.



SCL block



The SCL block performs scanner control, timing control, and bus control.
The scanner control block does not use the MCU because the MCU takes an image data.
The sensor block receives input of the sensor and switch state on the ADF. The bus control block performs the CPU bus control, image bus control, and DMA transmission between them. The timing control block forms CCD clock signals and DMA signals.

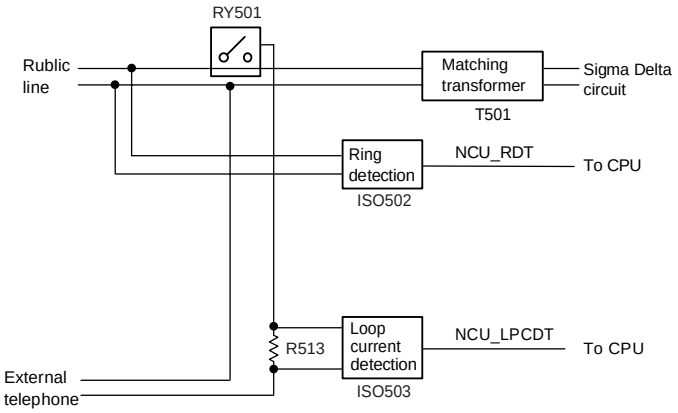


The LBP block controls the laser printer engine and the FIFO memory. Since sending/receiving of command/status with the LBP engine is made in the serial line, serial/parallel conversion is made in this block to make interface between the CPU and the LBP engine. The reference video signal generated in the PLL circuit is made to the video frequency necessary for the dividing circuit. Video data are sent to the laser engine in synchronization with this signal.
A 16M DRAM (1M × 16 bit) is used as the printer FIFO memory, which is used as the buffer memory in PC-scan.

(7) NCU circuit

The NCU circuit has the following functions:

- Matching between the public line and Sigma Delta circuit (MODEM circuit)
- To make OFF-hook state
- Ring detection
- External telephone connection
- Detection of OFF-hook state of the external telephone

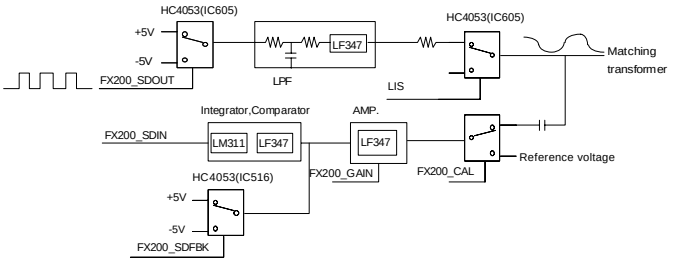


Relay RY501 connects the public line and the matching transformer. Relay RY501 connects the DC load line and the public line.
When RY501 is open, the external telephone is connected to the public telephone line. For calling sound from the public line, the signal is rectified and inputted to the photo coupler PC817 ISO502 to generate NCU_RDT signal.

The CPU judges whether calling is made from the public line or not referring to the frequency of the NCU_RDT signal.
By turning on RY501, the public line loop is closed. Then response of MFP is transmitted to the public line. (OFF-hook state). When the dial pulse is selected, RY501 is turned on/off according to the telephone number to transmit the remote telephone number to the public telephone line. In the tone pulse, the tone signal from the Sigma Delta circuit is passed through the matching transformer to the public telephone line.
The NCU_LPCDT signal is generated fromPC814 (ISO503) according to the potential generated in R513. When the external telephone is in OFF-hook state, a potential is generated in R513 to drive the MCU_LPCDT signal LOW. The CPU monitors the signal and judges whether the external telephone is busy or not.

(8) Sigma Delta circuit

The Sigma Delta circuit converts analog signals passed through the matching transformer into digital signals. The digital signals (FX200_SDOUT) outputted from FX200 are inputted to the analog switch to generate digital switch for switching with +5V/5V. The signals are converted into analog signals in the LPF circuit.

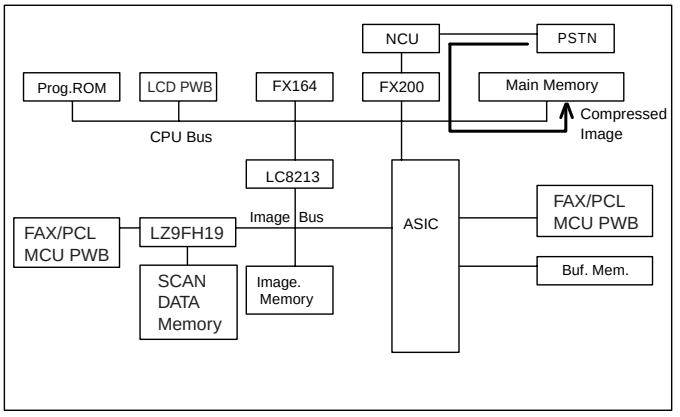


On the other hand, the analog signals inputted through the matching transformer are amplified in the AMP circuit. By combination with FX_200SDBFK signal and the integrator/comparator, the FX_200SDIN signal is made and inputted to FX200.

(9) Data flow

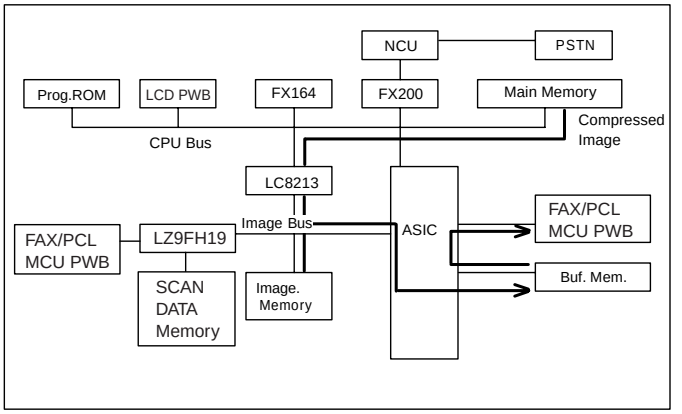
The data flow in each reception mode is shown below.

(FAX reception) Reception operation



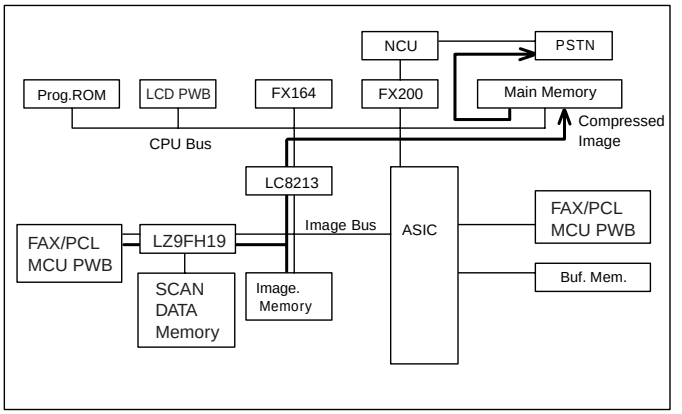
The FAX data from the public line are stored in the 16M DRAM. In this case, the data are stored in the received format, that is in MH, MR or MMR format. When reception of one page data is completed, printing is performed.

(FAX reception) Print operation



The FAX data stored in the main memory are transmitted to LC8213, where they are converted into bit map data, which are sent to ASIC and transmitted to the FAX/PCL MCU PWB for printing.

(FAX transmission)

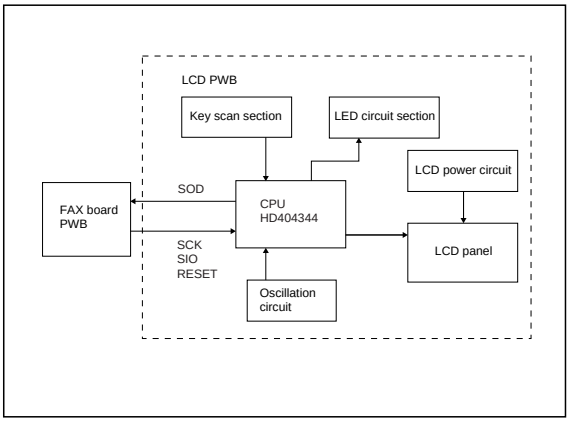


LZ9FH19 receives image data from FAX/PCL MCU and stores in the scan data memory. The mage data are transmitted to LC52113 and converted into MMR format. The converted data are stored in the main memory then read by FX200 and transmitted to the public line.

6. LCD circuit (AR-F152 only)

A. Outline

The LCD PWB is composed of the 4-bit, single-chip microprocessor, HD404344, the LCD panel, the key SW block, the LED circuit, and the shunt regulator circuit. The block diagram is shown below.
The LCD PWB is composed of the key scan process block, the serial I/O process block, the LED lighting process block, the LCD display process block, the reset process block, the oscillation circuit, and the LCD power circuit. These circuits are driven by 5V, and only the LCD circuit is driven by 12V to generate 5.2V as the LCD display drive voltage.



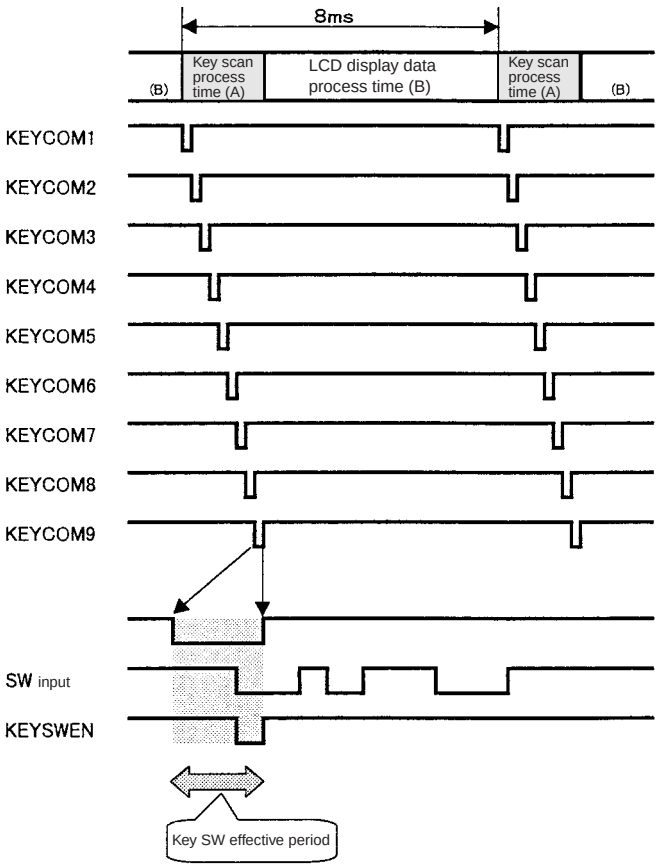
B. CPU pin table

Pin No.	Signal name	Input/Output
1	LED1	Output
2	LED2	Output
3	LCDRS	Input/Output
4	LCDRW	Input/Output
5	LCDB4	Input/Output
6	LCDB5	Input/Output
7	LCDB6	Input/Output
8	LCDB7	Input/Output
9	OSC1	Input
10	OSC2	Output
11	GND	–
12	KEYCOM1	Output
13	KEYCOM2	Output
14	KEYCOM3	Output
15	KEYCOM4	Output
16	V_{CC}	–
17	TEST	Input
18	/PANEL RESET	Input
19	/SCK	Input
20	SID	Input
21	SOD	Output
22	LCDE	Output
23	KEYCOM9	Output
24	KEYCOM8	Output
25	LED3	Output
26	KEYCOM7	Output
27	KEYCOM6	Output
28	KEYCOM5	Output

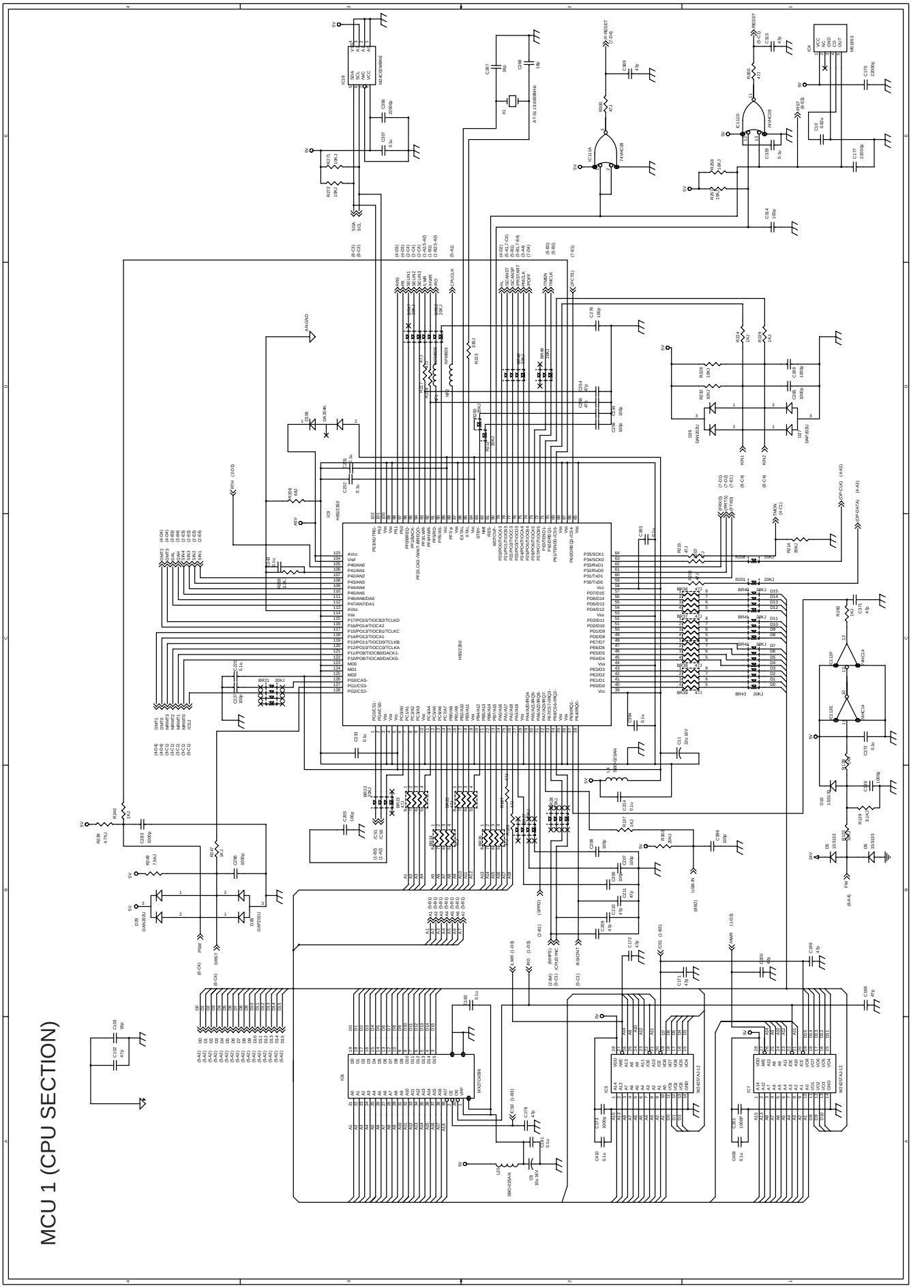
C. LCD panel pin arrangement

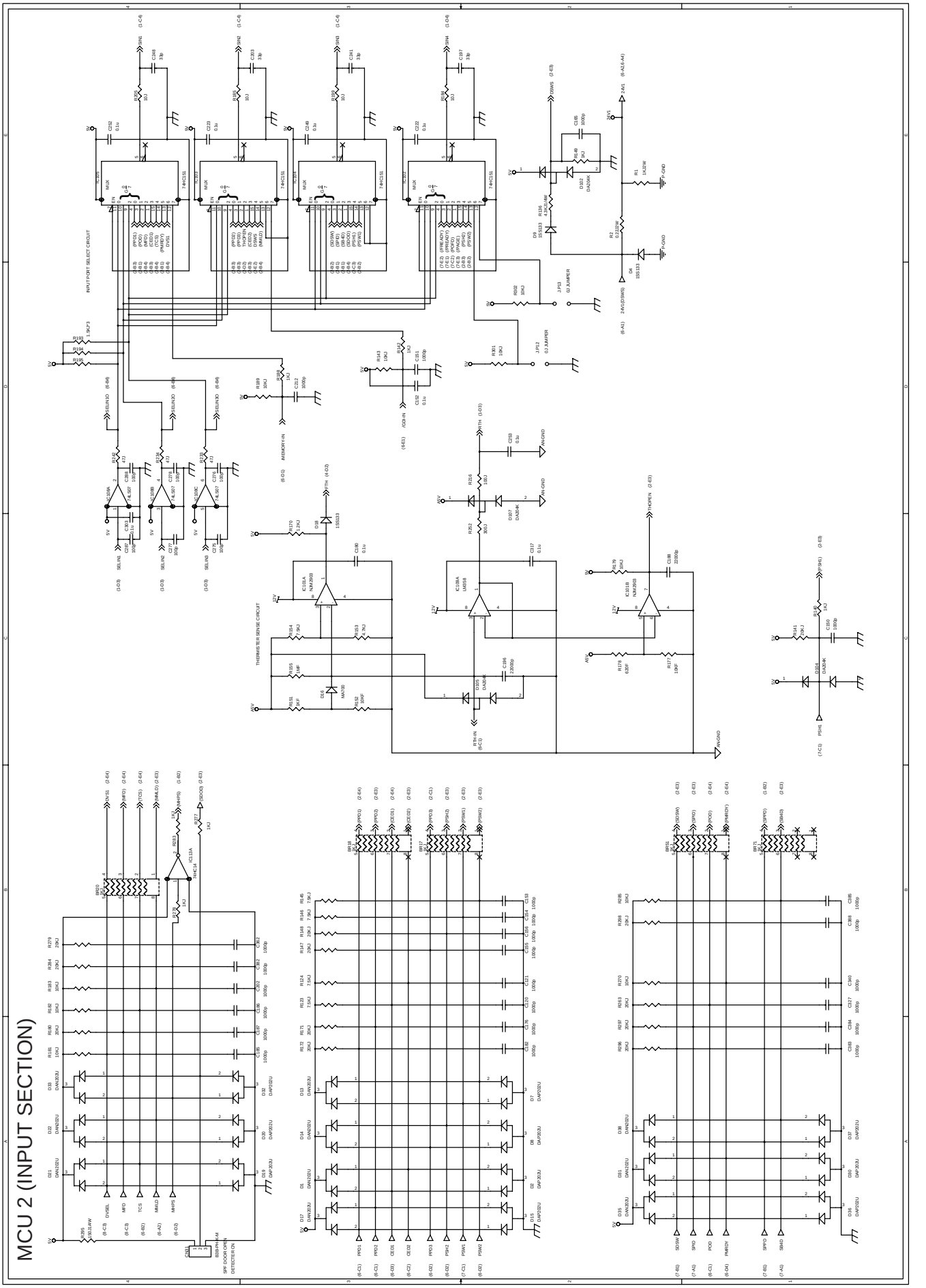
Pin No.	Signal name	Input/Output	Remark
1	LCDRS	Input	H: Data input; L: Instruction input
2	LCDRW	Input	H: Data read; L: Data write
3	LCDE	Input	Enable signal
4	DB0	Input	Not used.
5	DB1	Input	Not used
6	DB2	Input	Not used
7	DB3	Input	Not used
8	LCDB4	Input	Data bus line
9	LCDB5	Input	Data bus line
10	LCDB6	Input	Data bus line
11	LCDB7	Input	Data bus line
12	V_{SS}	–	0V
13	V_{DD}	–	+5.2V
14	Vin	–	+5.2V
15	V5	–	LCD drive power
16	GND	–	Frame GND

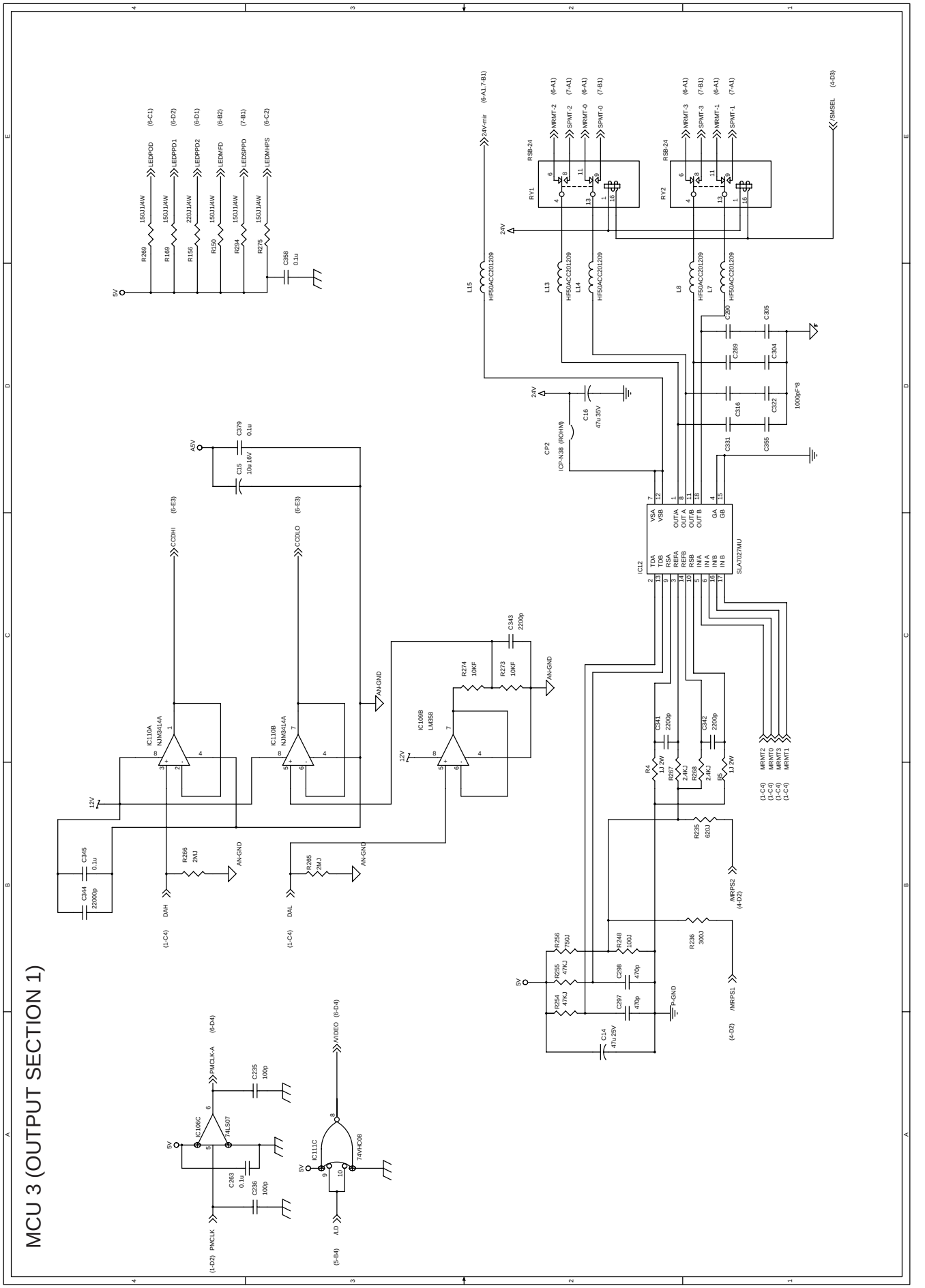
D. Key scan input process diagram

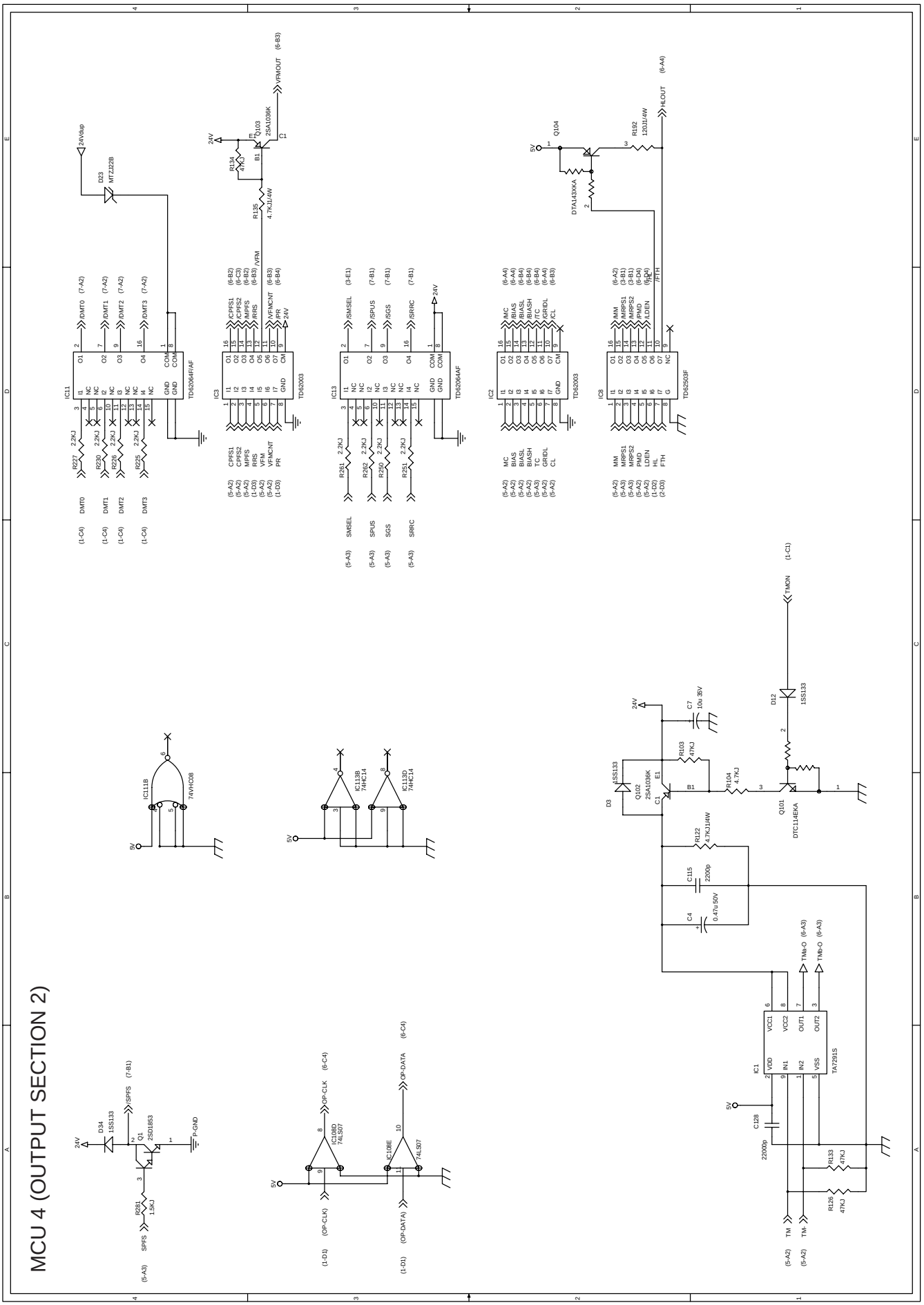


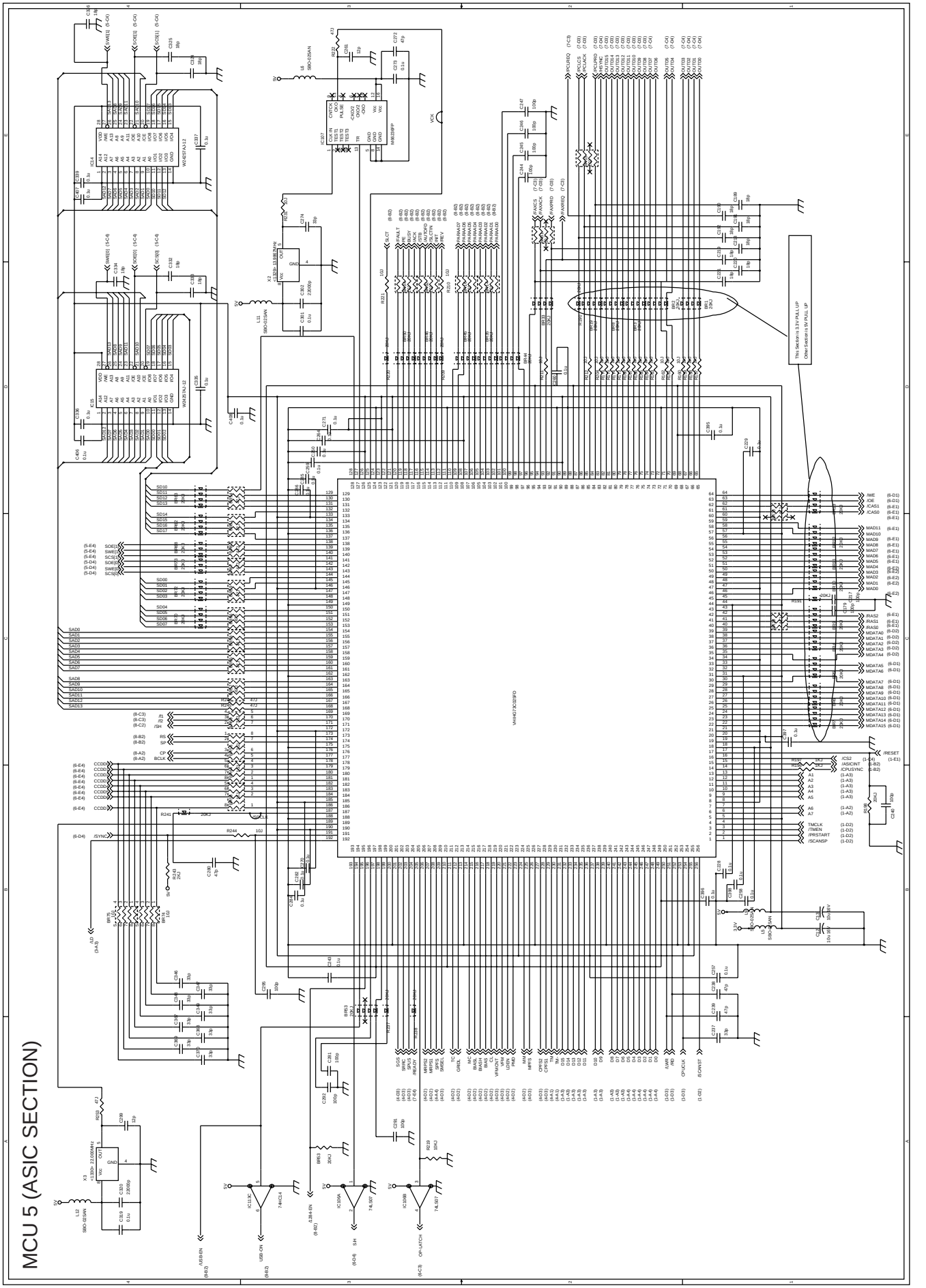
[13] CIRCUIT DIAGRAM



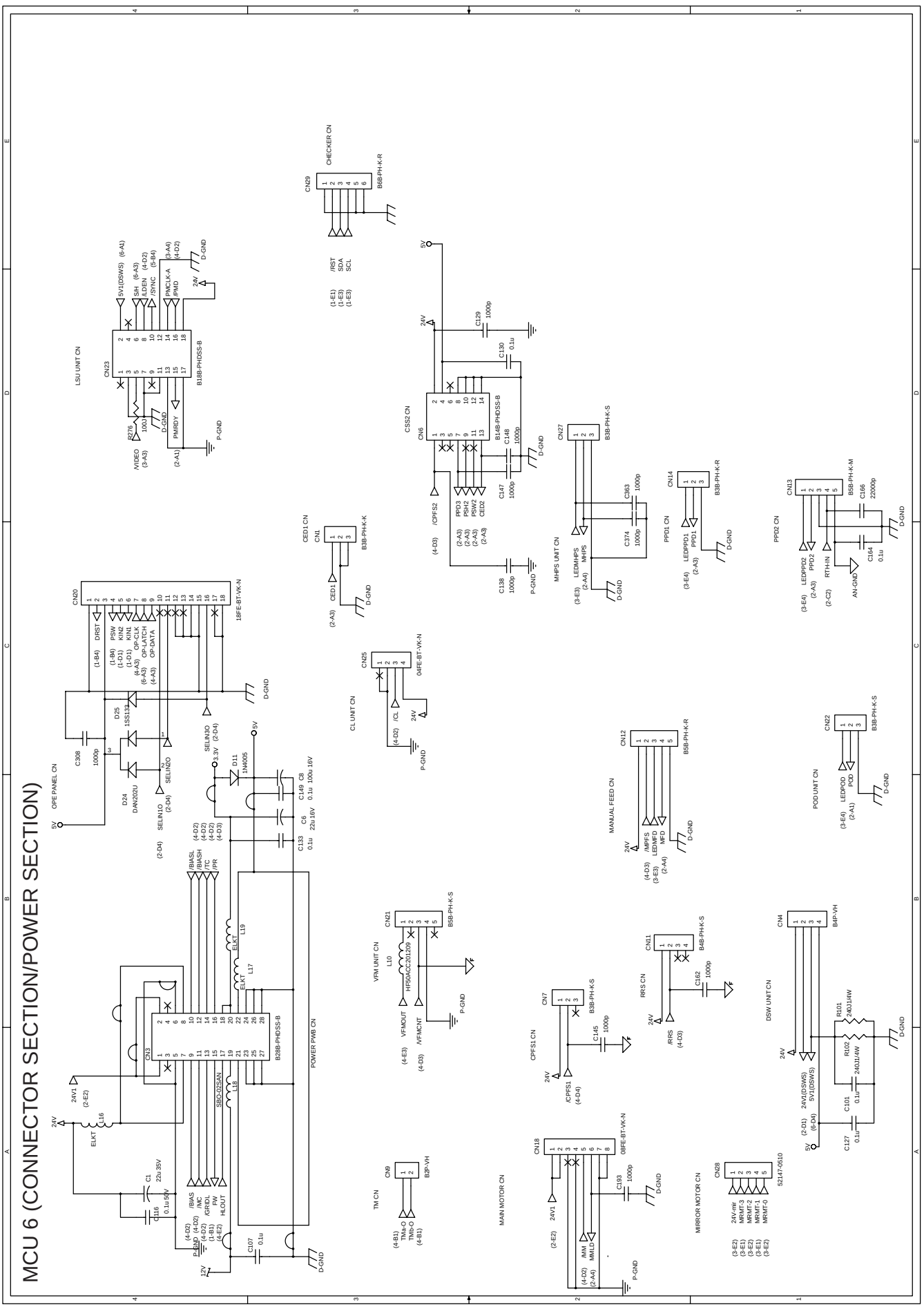

MCU 2 (INPUT SECTION)
INPUT PORT SELECT CIRCUIT
THERMISTER SENSE CIRCUIT
SPF DOOR OPEN DETECTION


MCU 3 (OUTPUT SECTION 1)
IC12
SLA7027MU
IC110A
NJM5414A
IC110B
NJM5414A
IC109B
LM358
IC106C
74LS07
IC111C
74VHC08
RY1
RY2
RSB-24
L15
L13
L14
L8
L7
HF50ACC201209
CP2
ICP-N38 (ROHM)
C16
47u 35V
C15
10u 16V
C379
0.1u
C358
0.1u
C345
0.1u
C344
2200p
C343
2200p
C341
2200p
C342
2200p
C283
0.1u
C235
100p
C236
100p
C14
47u 25V
C297
470p
C298
470p
C289
C304
C305
C316
C322
C331
C385
1000pF*8
R4
1J 2W
R5
1J 2W
R235
620J
R236
300J
R248
100J
R254
47KJ
R255
47KJ
R256
750J
R266
2MJ
R265
2MJ
R267
2.4KJ
R268
2.4KJ
R269
150J 1/4W
R159
150J 1/4W
R156
220J 1/4W
R150
150J 1/4W
R094
150J 1/4W
R275
150J 1/4W
R274
10KF
R273
10KF
5V
12V
24V
A5V
AN-GND
P-GND
DAH
DAL
PMCLK
/LD
/VIDEO
/MRPS1
/MRPS2
SMSEL
MRMT2
MRMT0
MRMT3
MRMT1
EDPPOD
EDPPPD1
EDPPPD2
EDMFPD
EDSPPD
EDMHPS
CCDHI
CCDLO
24V-mtr
MRMT-2
SPMT-2
MRMT-0
SPMT-0
MRMT-3
SPMT-3
MRMT-1
SPMT-1

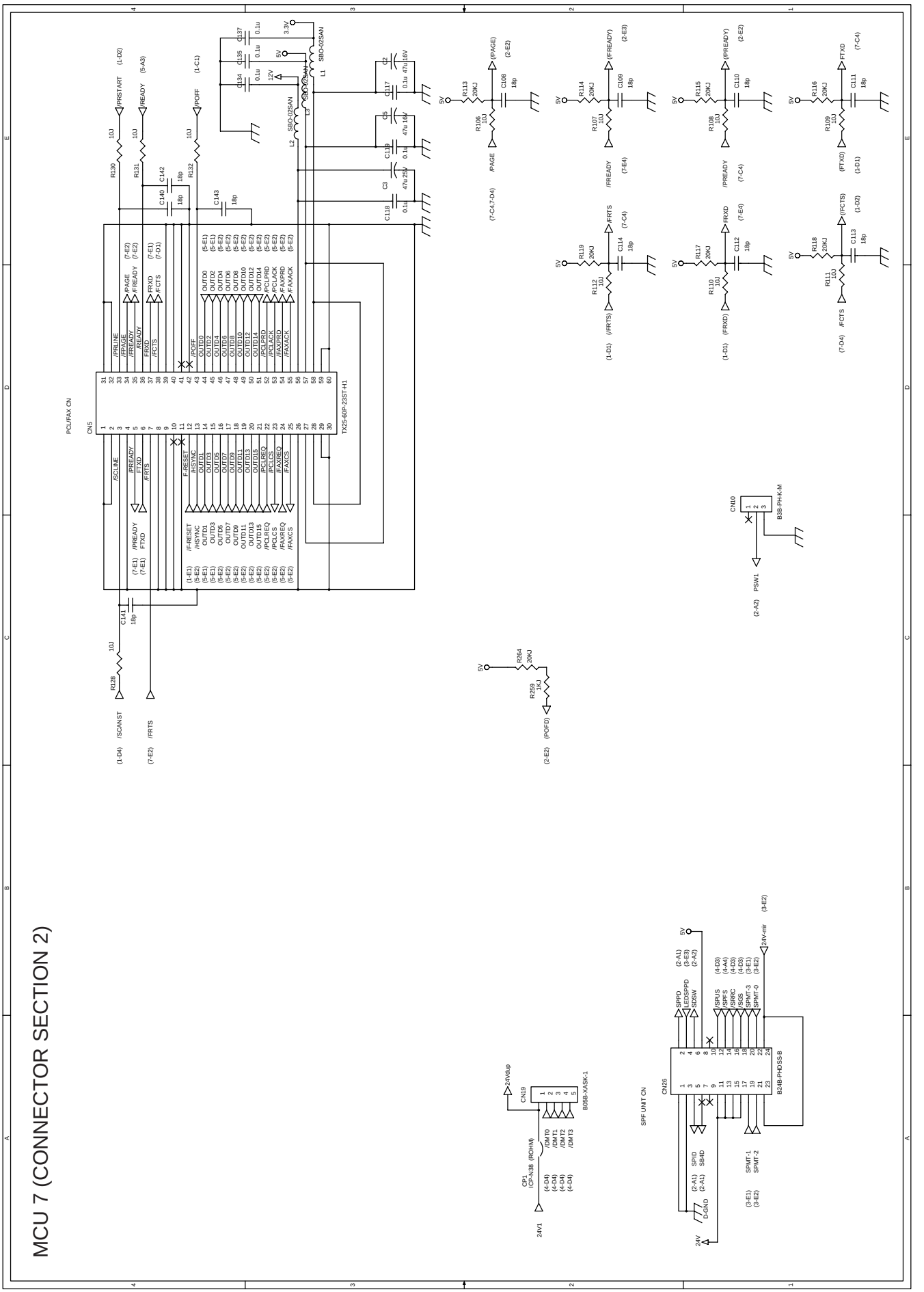

MCU 4 (OUTPUT SECTION 2)
24Vdsp
D23
MTZJ22B
IC11
TD62064F/AF
R227 2.2KJ
R230 2.2KJ
R226 2.2KJ
R225 2.2KJ
DMT0
DMT1
DMT2
DMT3
IC3
TD62003
CPFS1
CPFS2
MPPS
RRS
VFM
VFMCNT
PR
24V
Q103
2SA1036K
R134 4.7KJ
R135 4.7KJ/4W
VFMOUT
IC13
TD62064AF
R261 2.2KJ
R262 2.2KJ
R260 2.2KJ
R251 2.2KJ
SMSEL
SPUS
SGS
SRRC
IC2
TD62003
MC
BIAS
BIASL
BIASH
TC
GRDL
CL
Q104
DTA143XKA
R192 120J/4W
HLOUT
IC8
TD62503F
MM
MRPS1
MRPS2
PMD
LDEN
HL
FTH
IC111B
74VHC08
IC113B
74HC14
IC113D
74HC14
D34
1SS133
SPFS
Q1
2SD1853
P-GND
R281 1.5KJ
IC108D
74LS07
IC108E
74LS07
OP-CLK
OP-DATA
D3
1SS133
Q102
2SA1036K
R103 47KJ
R104 4.7KJ
C7 10u 35V
D12
1SS133
Q101
DTC114EKA
TMDN
R122 4.7KJ/4W
C115 2200p
C4 0.47u 50V
IC1
TA72915
C128 22000p
R133 47KJ
R126 47KJ
TMh-O
TM
TMh


MCU 5 (ASIC SECTION)
VHH57JC0EPD
This Section is 3.3V PULL UP
Other Section is 5V PULL UP

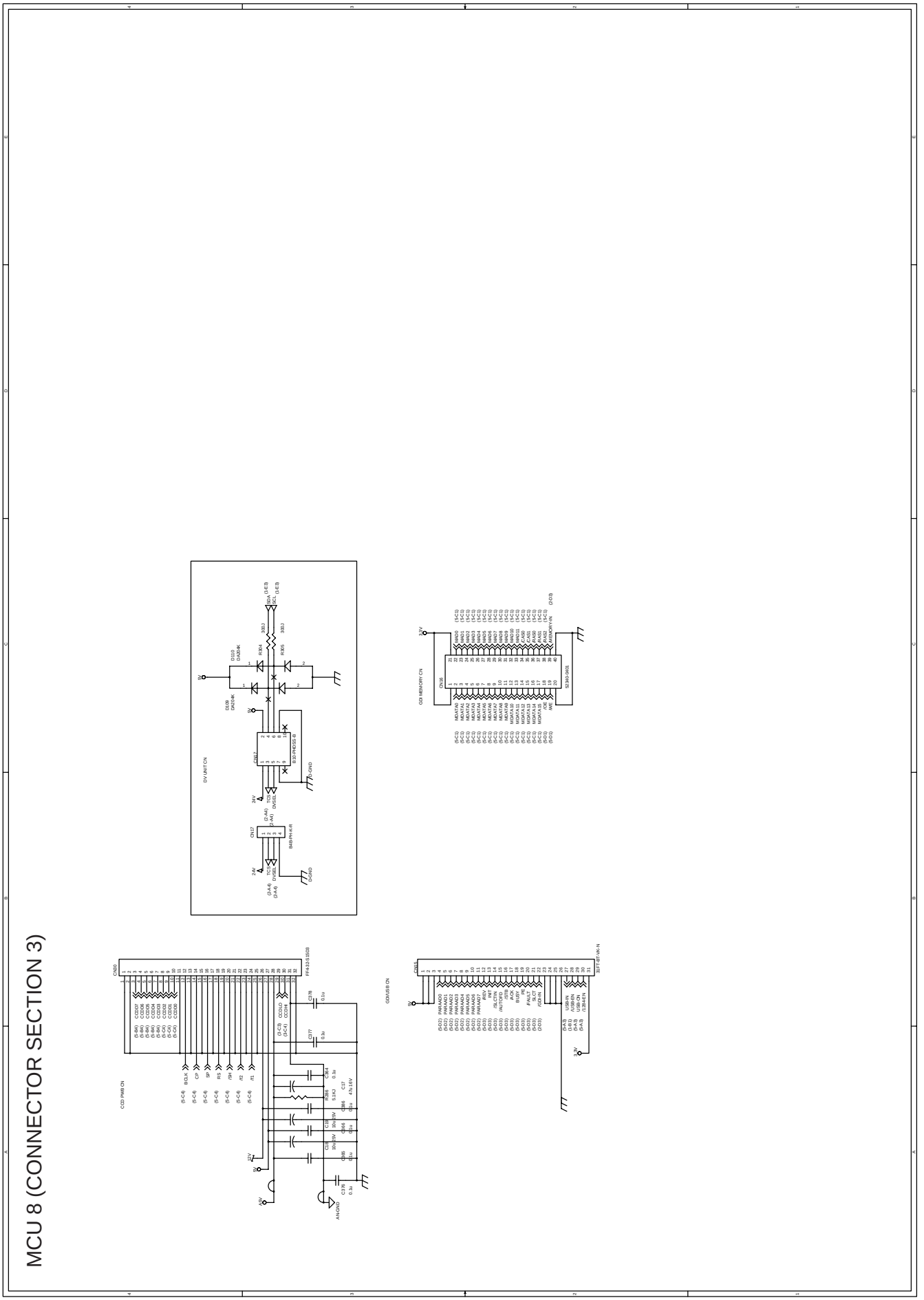
MCU 6 (CONNECTOR SECTION/POWER SECTION)

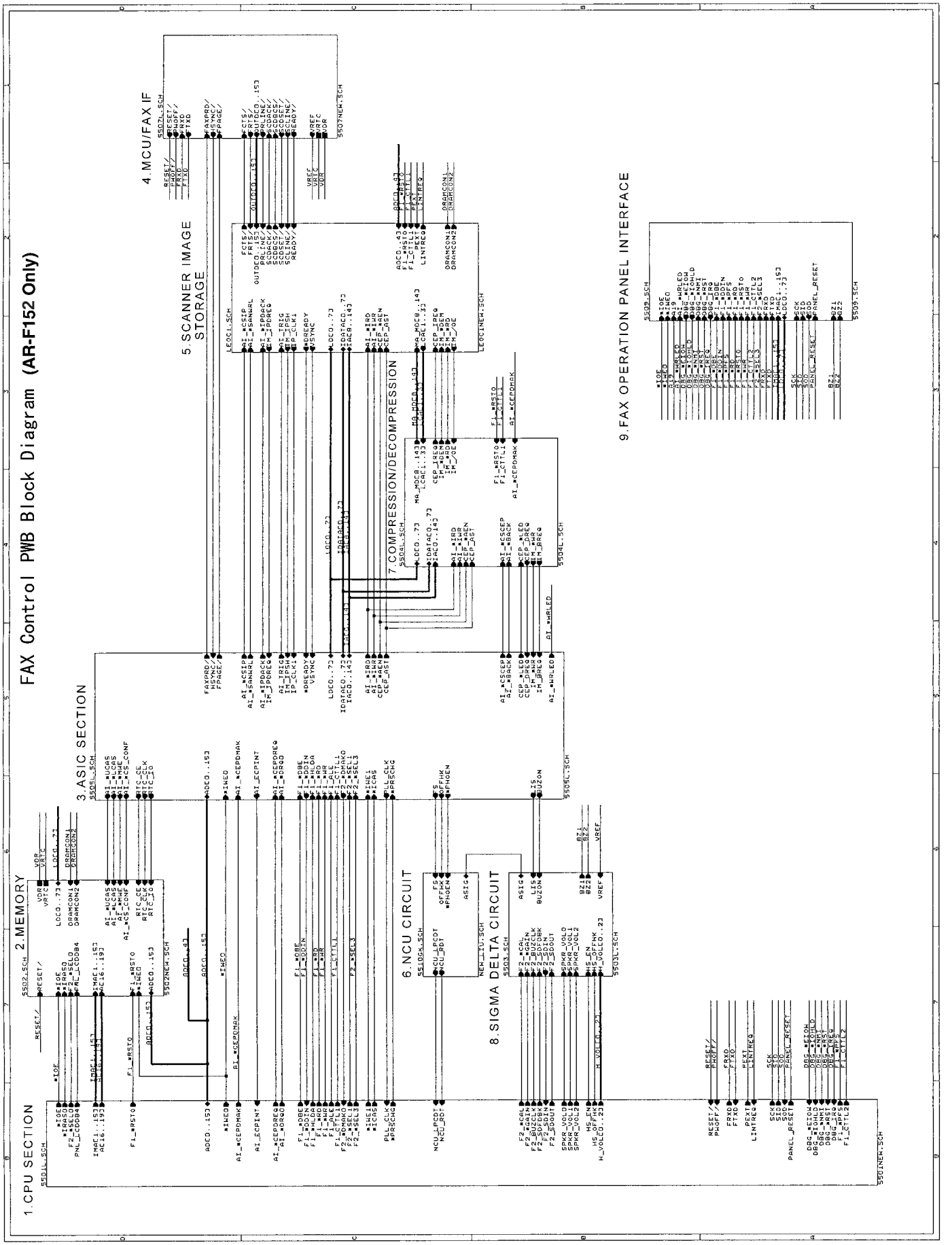


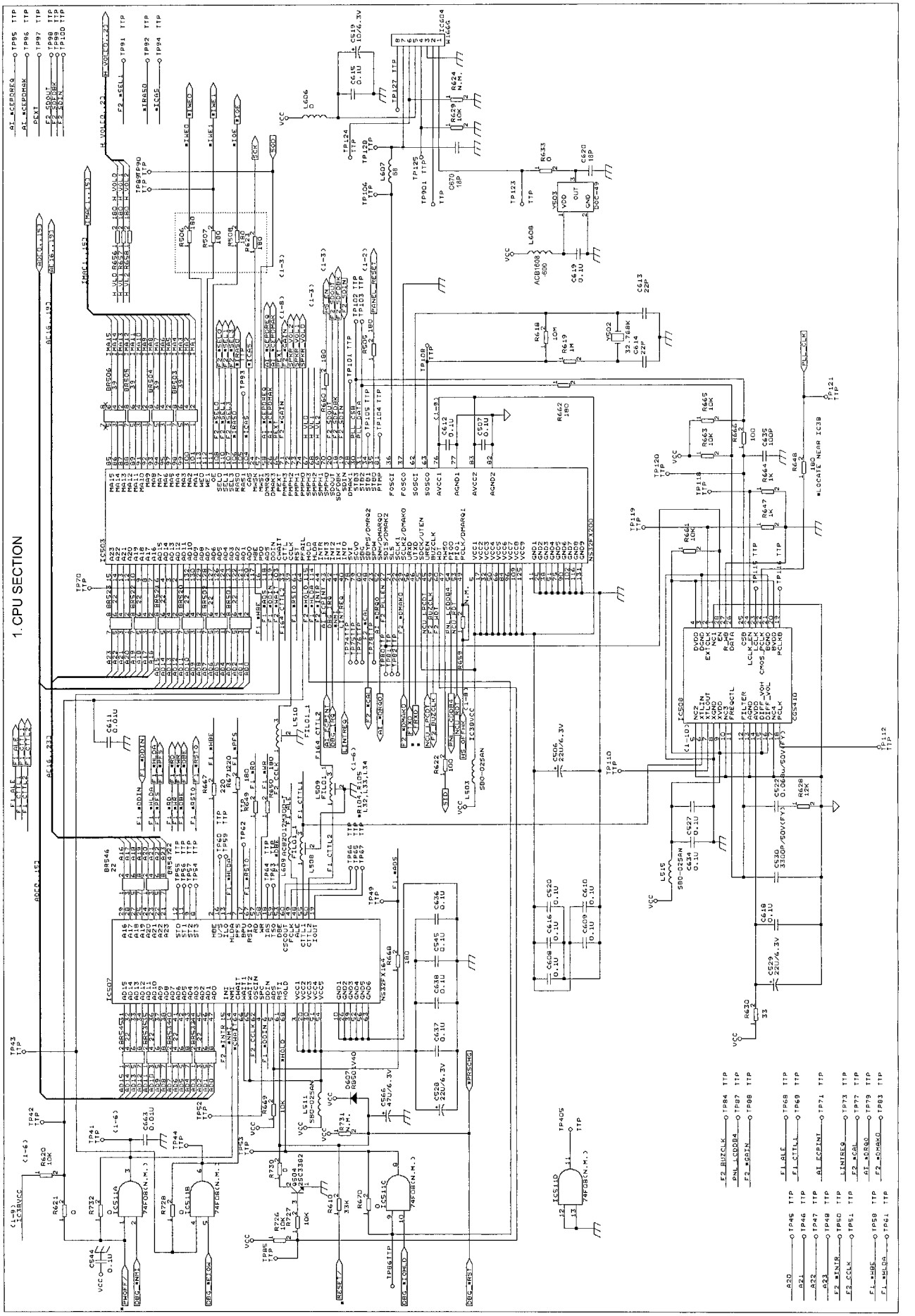
MCU 7 (CONNECTOR SECTION 2)

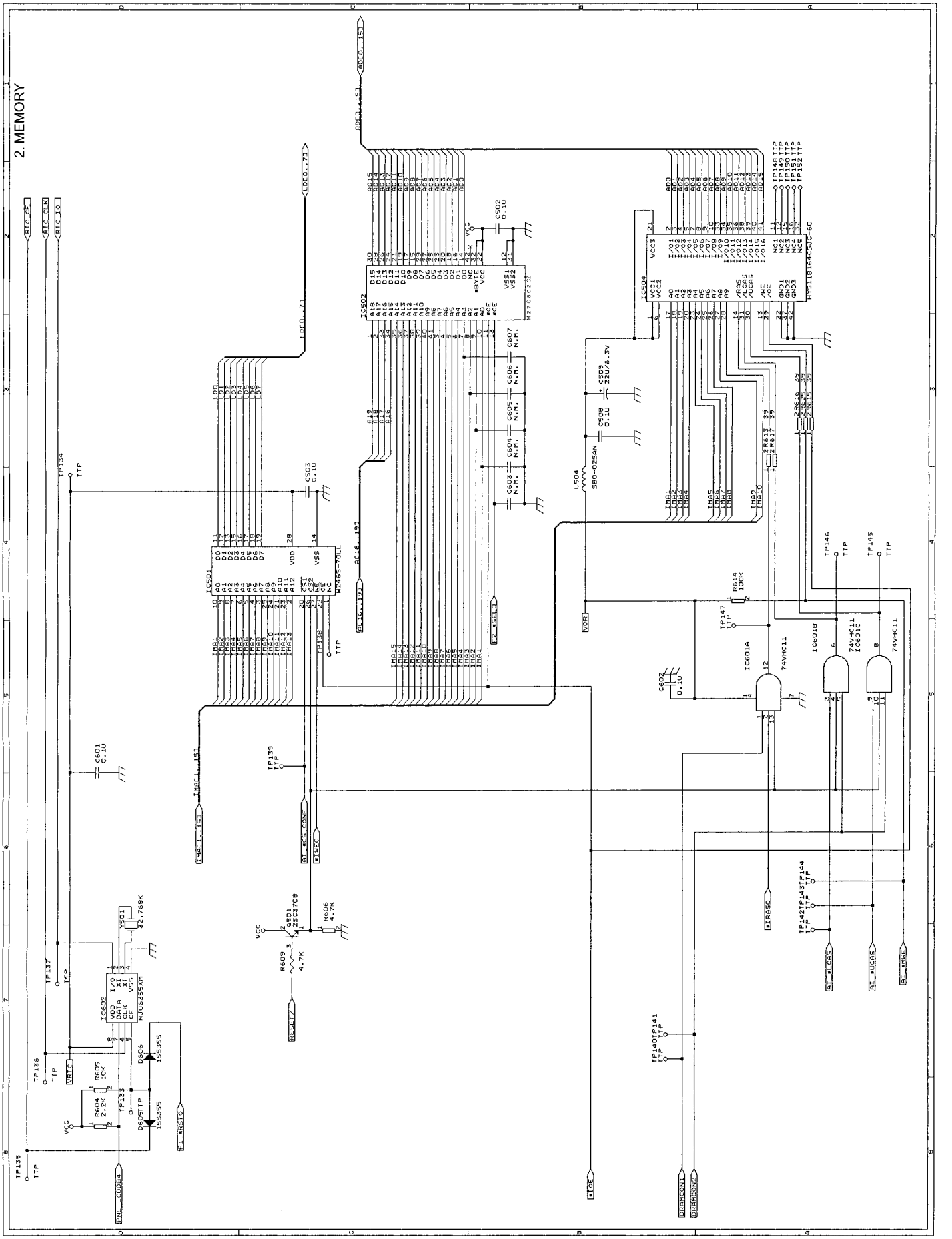


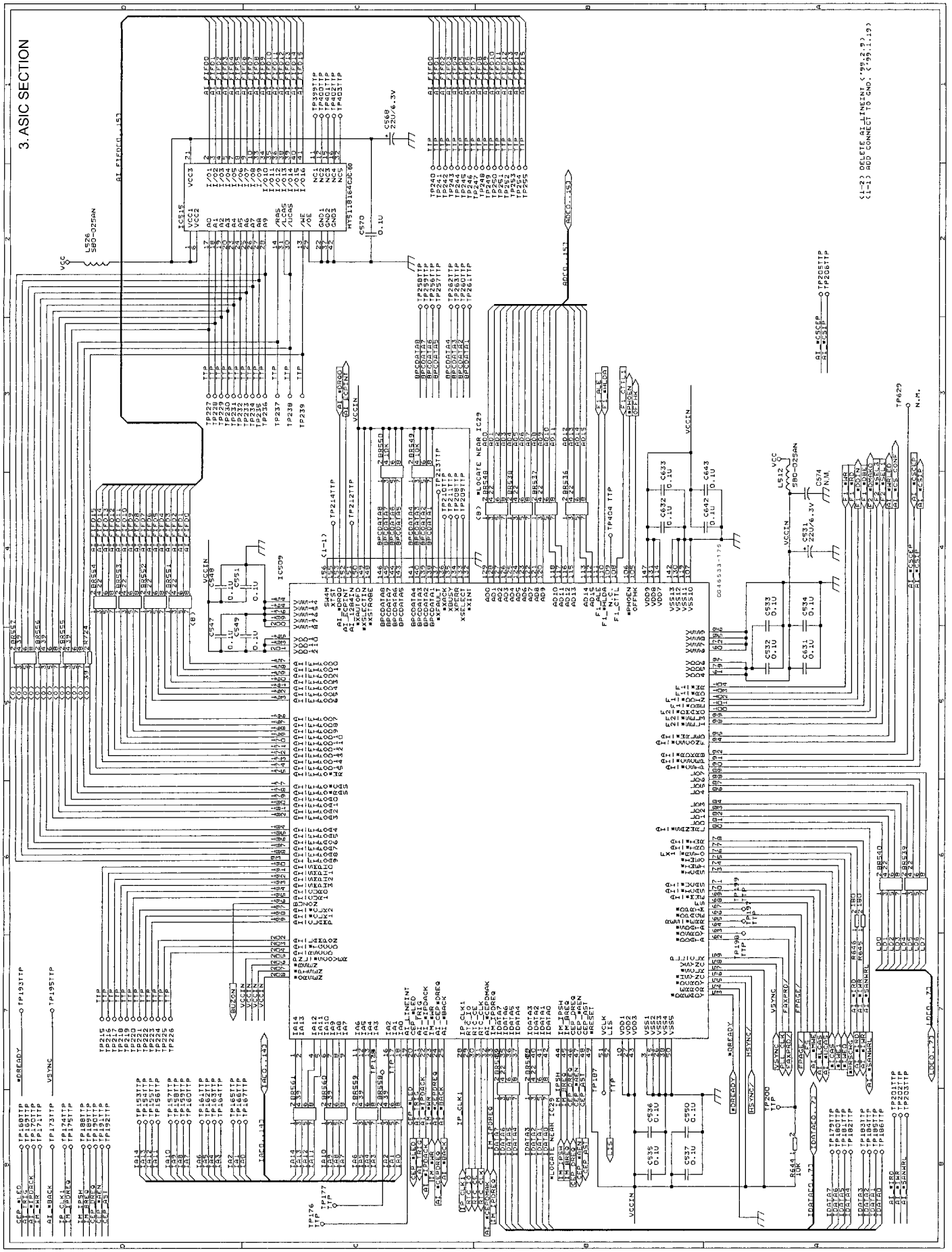
MCU 8 (CONNECTOR SECTION 3)

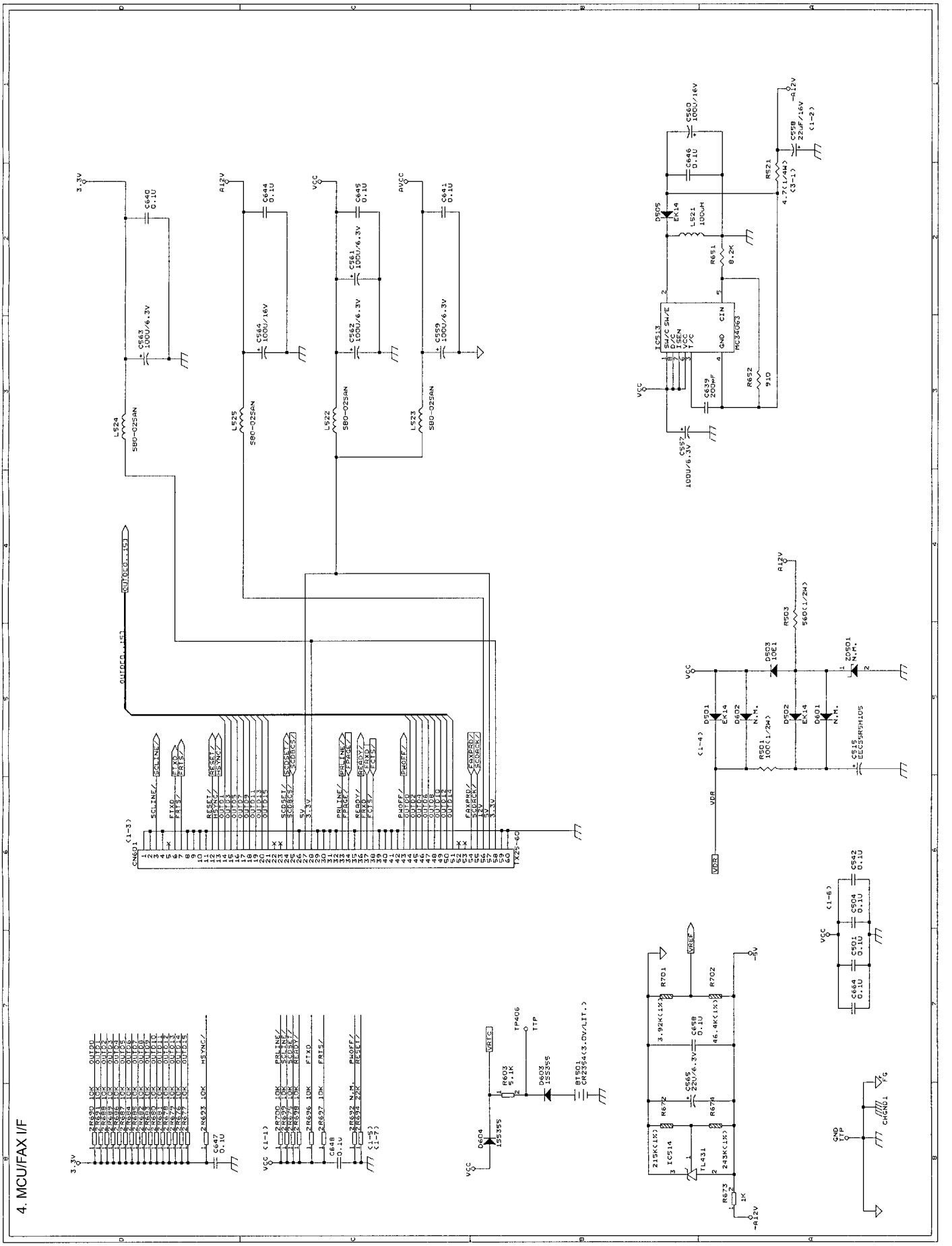



FAX Control PWB Block Diagram (AR-F152 Only)
1.CPU SECTION
2.MEMORY
3.ASIC SECTION
4.MCU/FAX IF
5.SCANNER IMAGE STORAGE
6.NCU CIRCUIT
7.COMPRESSION/DECOMPRESSION
8.SIGMA DELTA CIRCUIT
9.FAX OPERATION PANEL INTERFACE

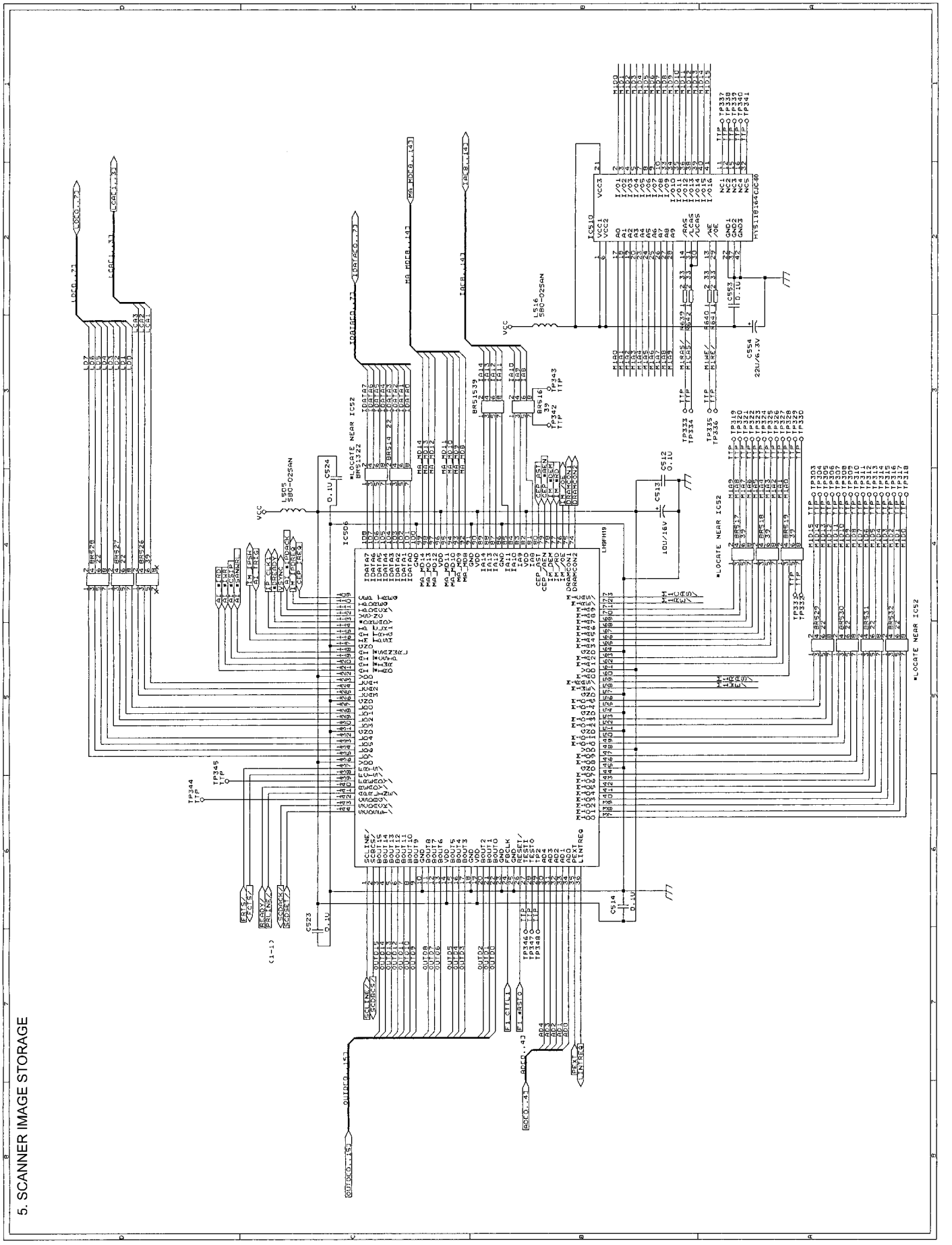

1. CPU SECTION


2. MEMORY

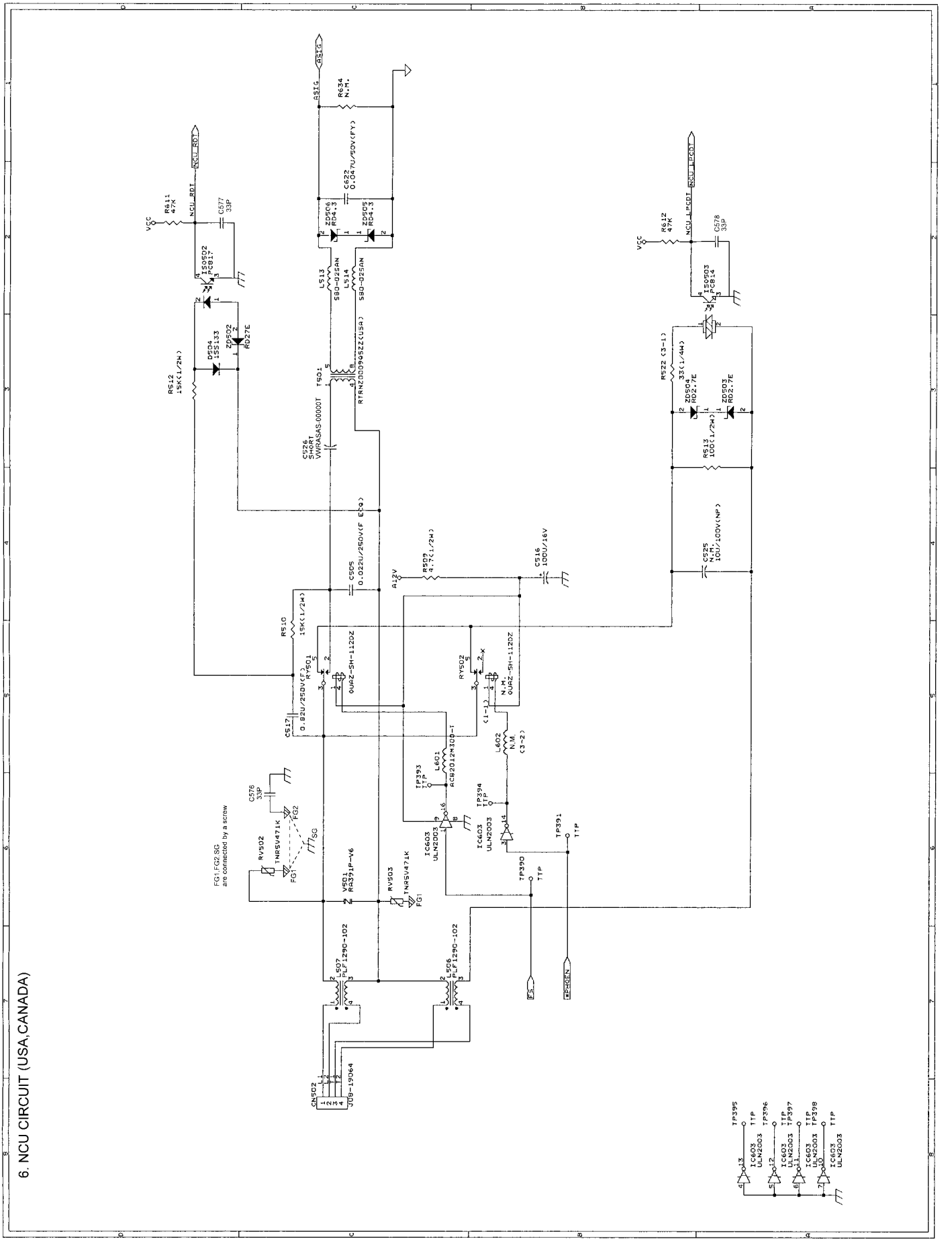

3. ASIC SECTION


4. MCU/FAX I/F

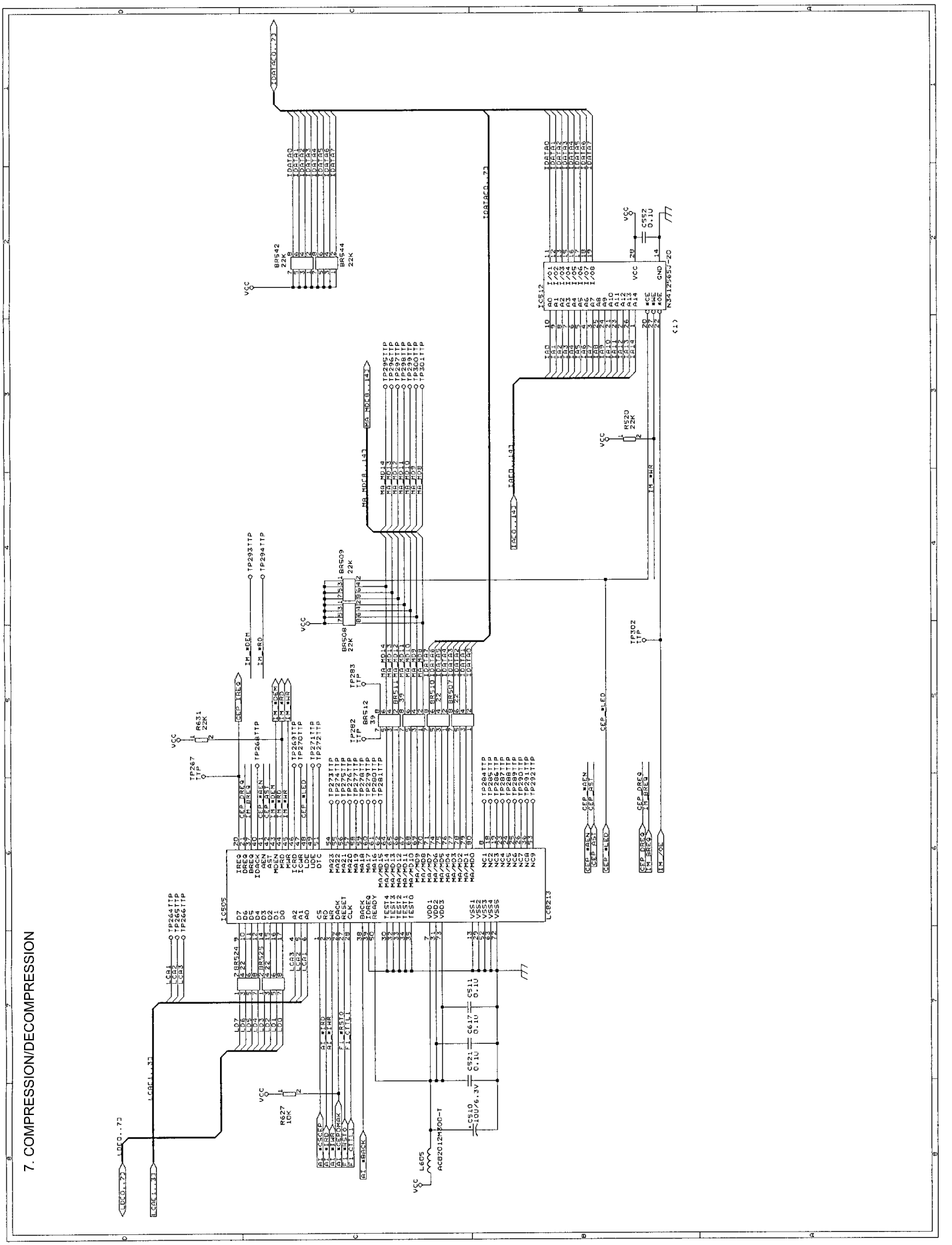
5. SCANNER IMAGE STORAGE



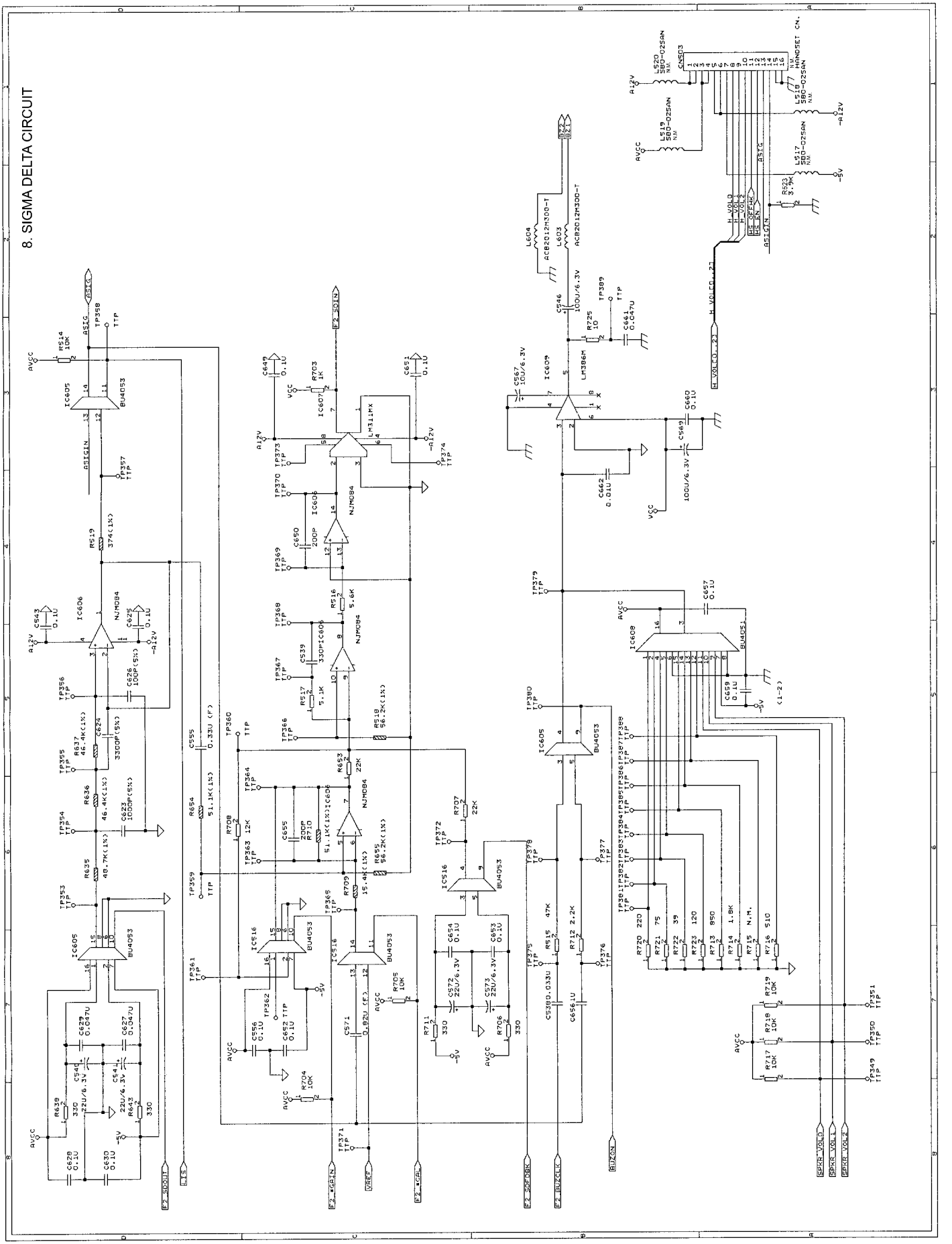
6. NCU CIRCUIT (USA,CANADA)



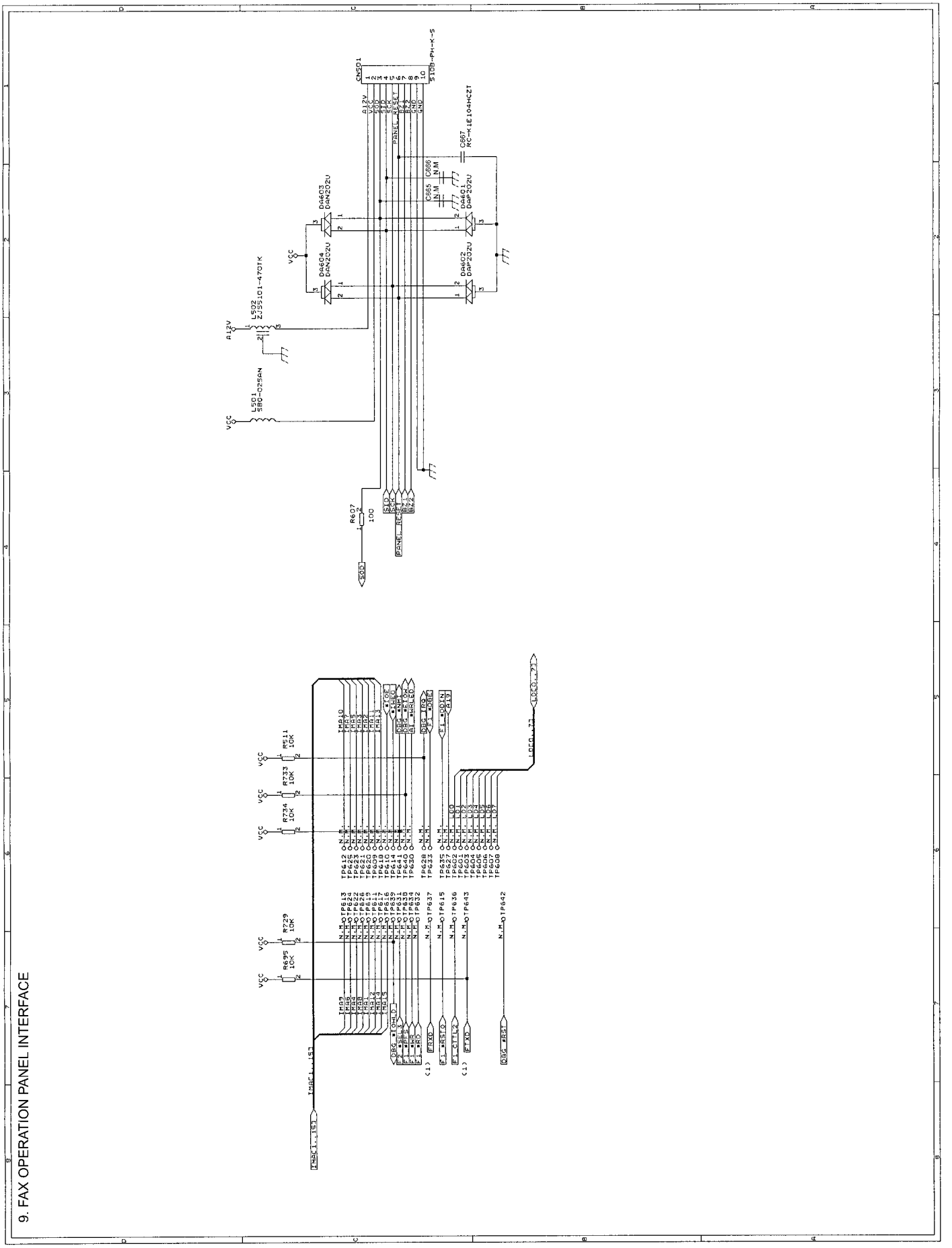
7. COMPRESSION/DECOMPRESSION

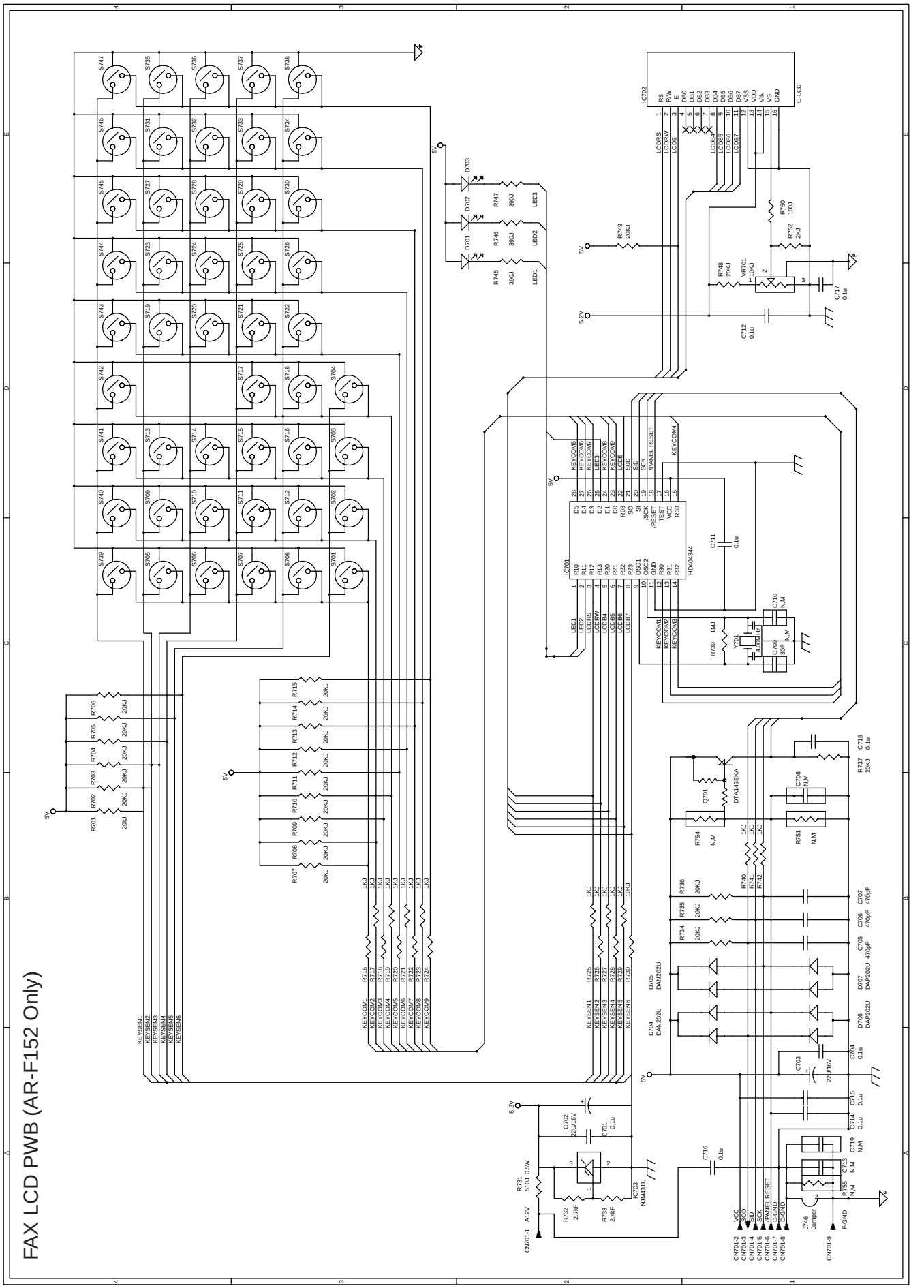


8. SIGMA DELTA CIRCUIT

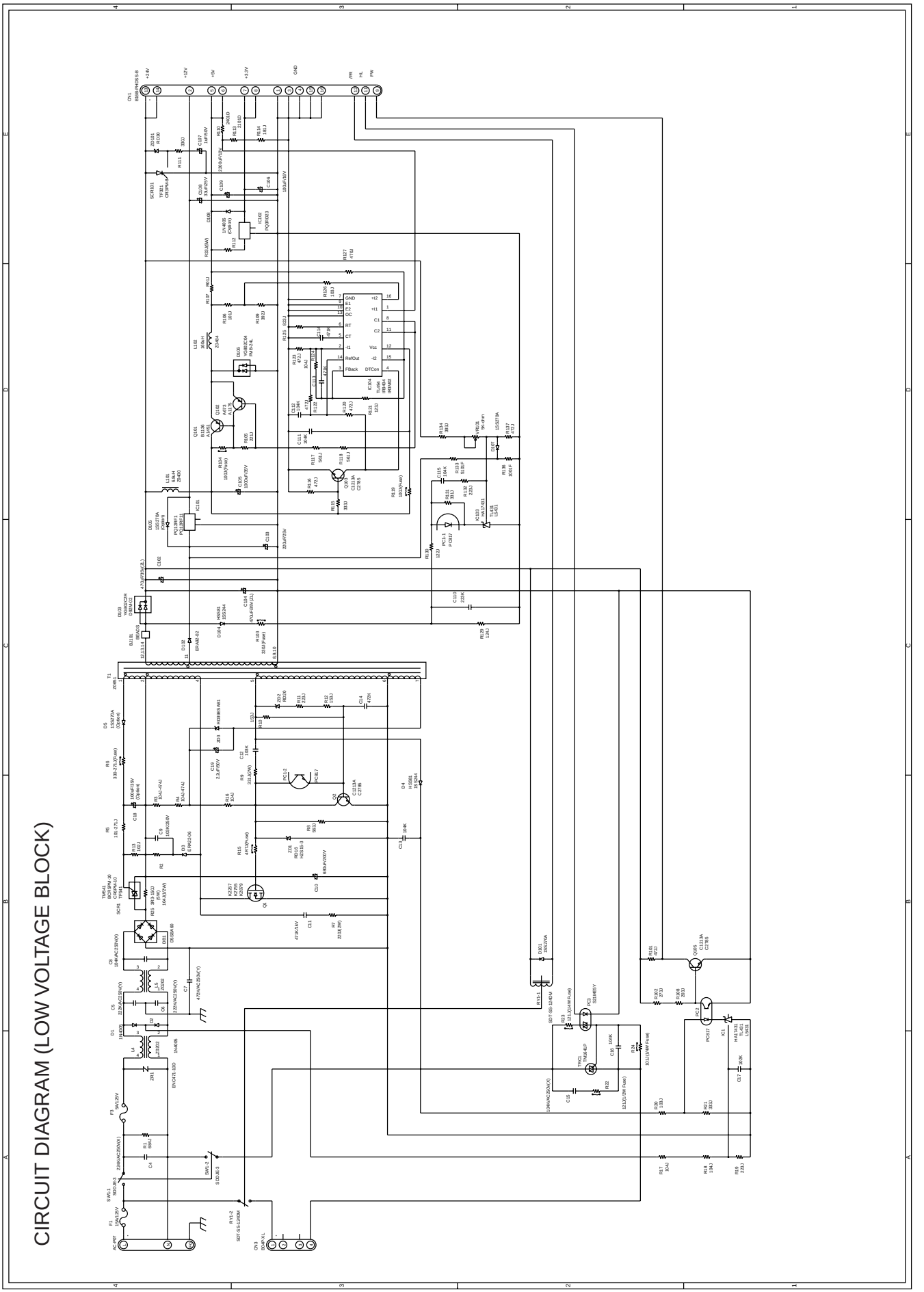


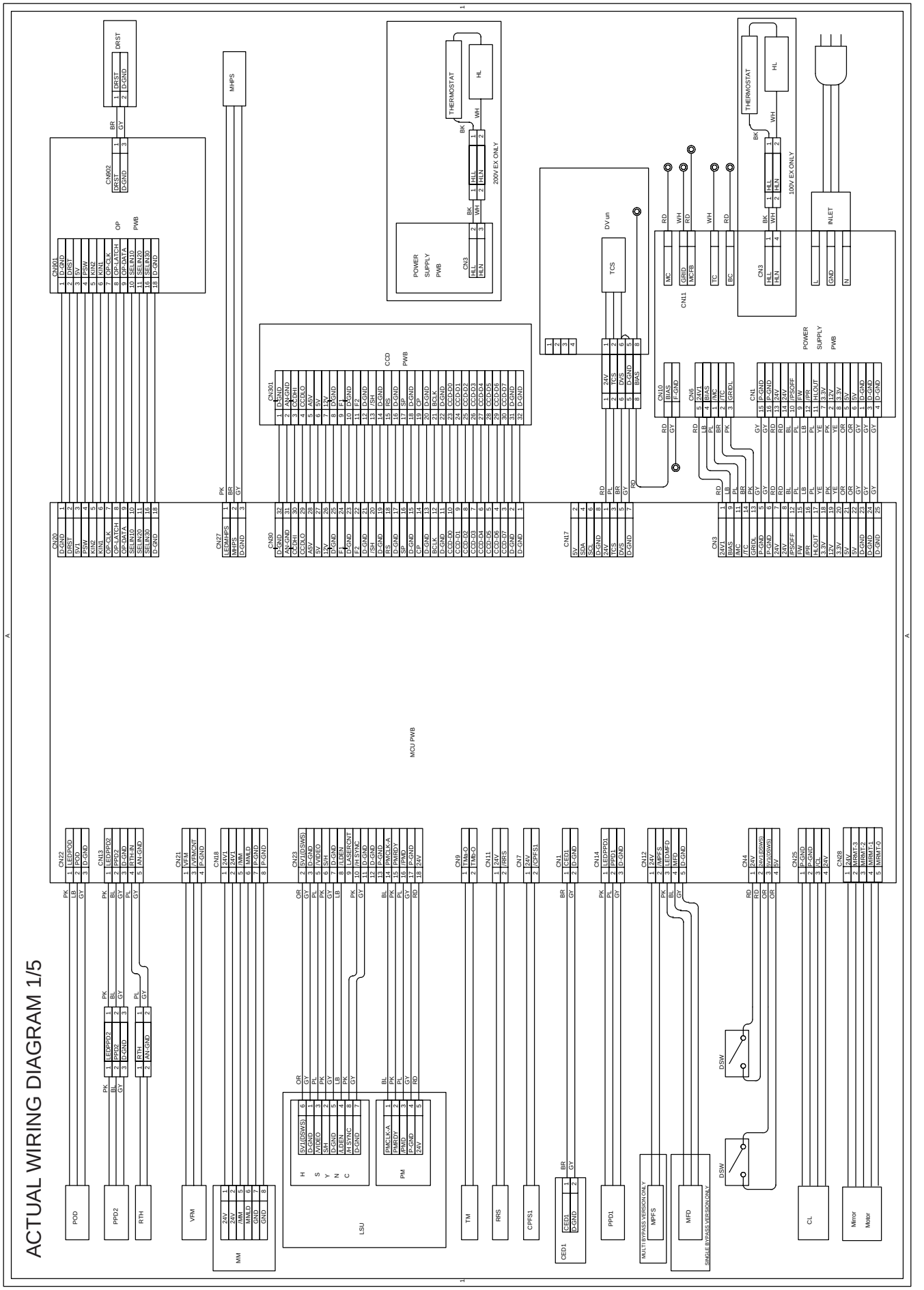
9. FAX OPERATION PANEL INTERFACE



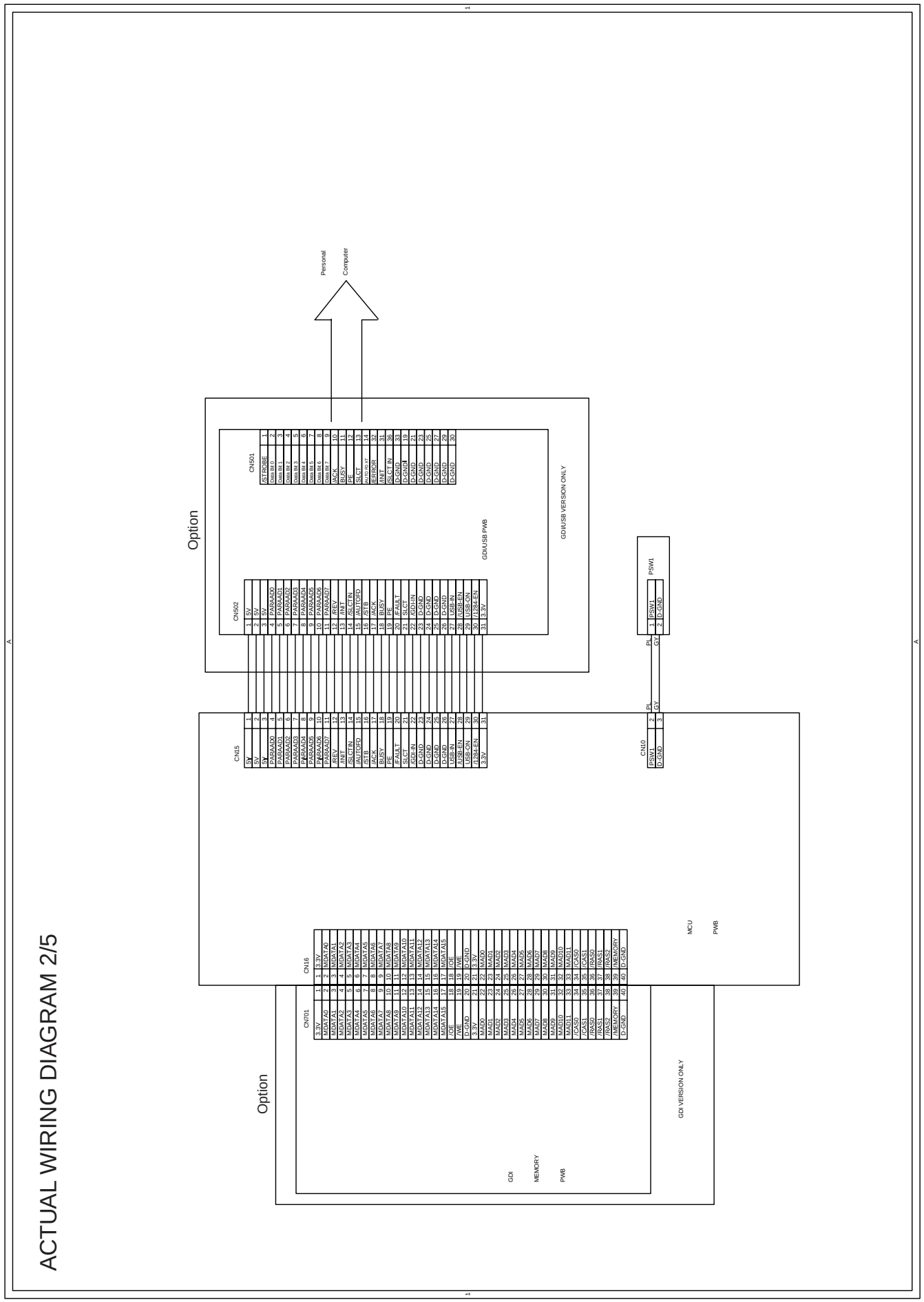

FAX LCD PWB (AR-F152 Only)

CIRCUIT DIAGRAM (LOW VOLTAGE BLOCK)

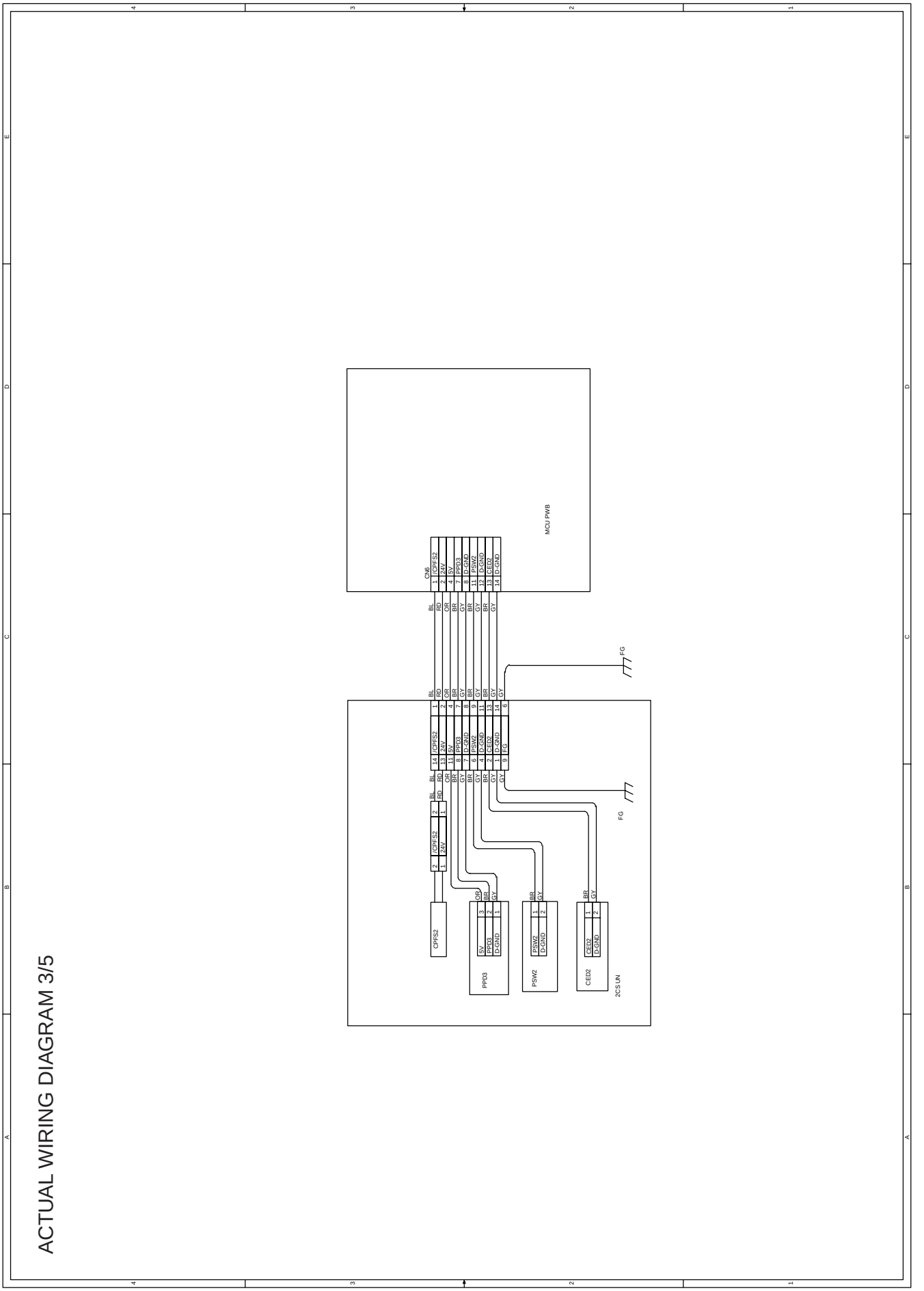


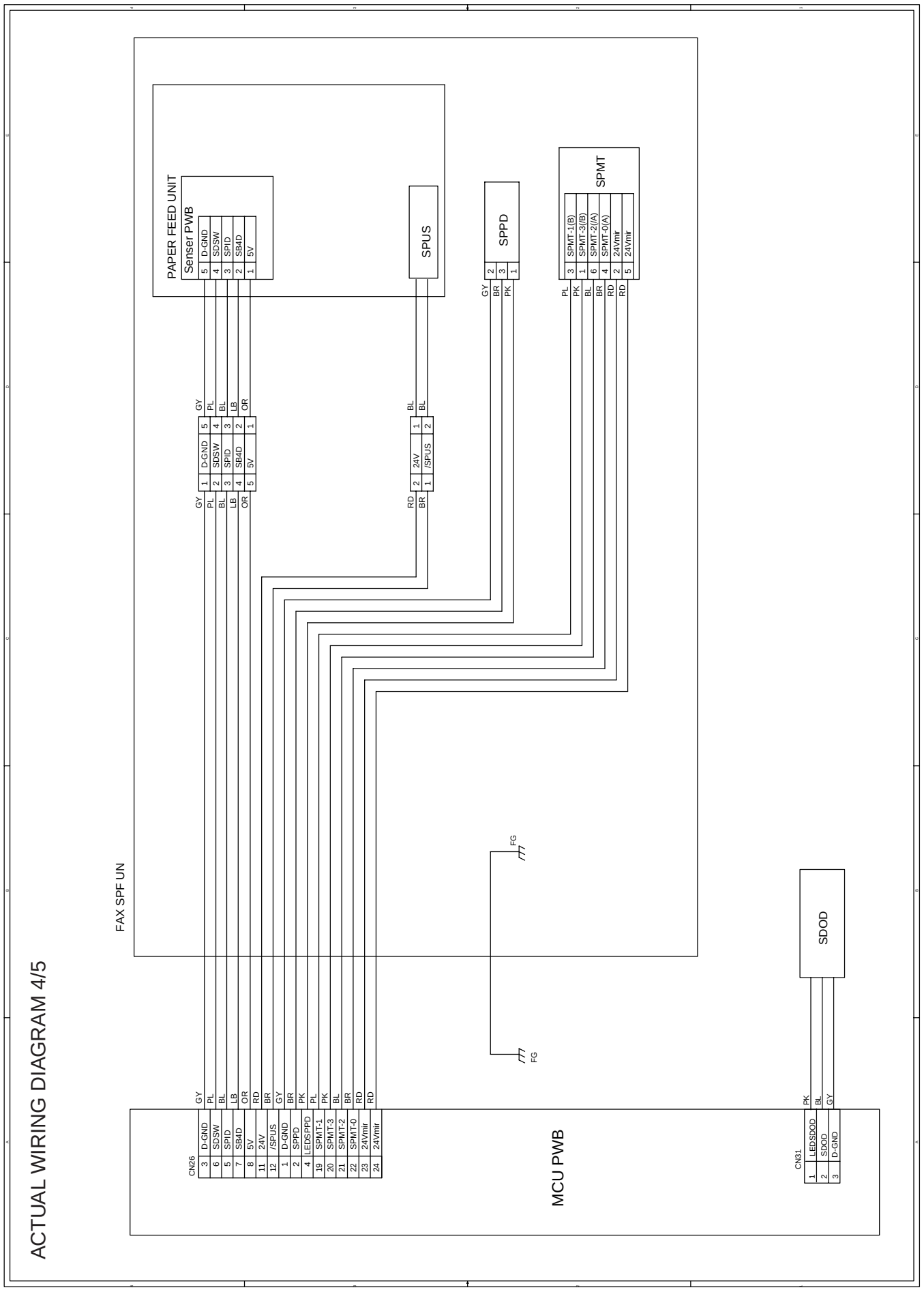

ACTUAL WIRING DIAGRAM 1/5
MCU PWB
POWER SUPPLY PWB
OP PWB
CCD PWB
LSU
MM
PM
POD
PPD2
RTH
VFM
TM
RRS
CPFS1
CED1
PPD1
MPFS
MFD
CL
Mirror
Motor
DSW
MULTI BYPASS VERSION ONLY
SINGLE BYPASS VERSION ONLY
THERMOSTAT
HL
200V EX ONLY
100V EX ONLY
INLET
TCS
DV un
MHPS
CN20
CN301
CN3
CN6
CN1
CN11
CN902
CN901
CN17
CN7
CN8
CN9
CN12
CN14
CN25
CN28

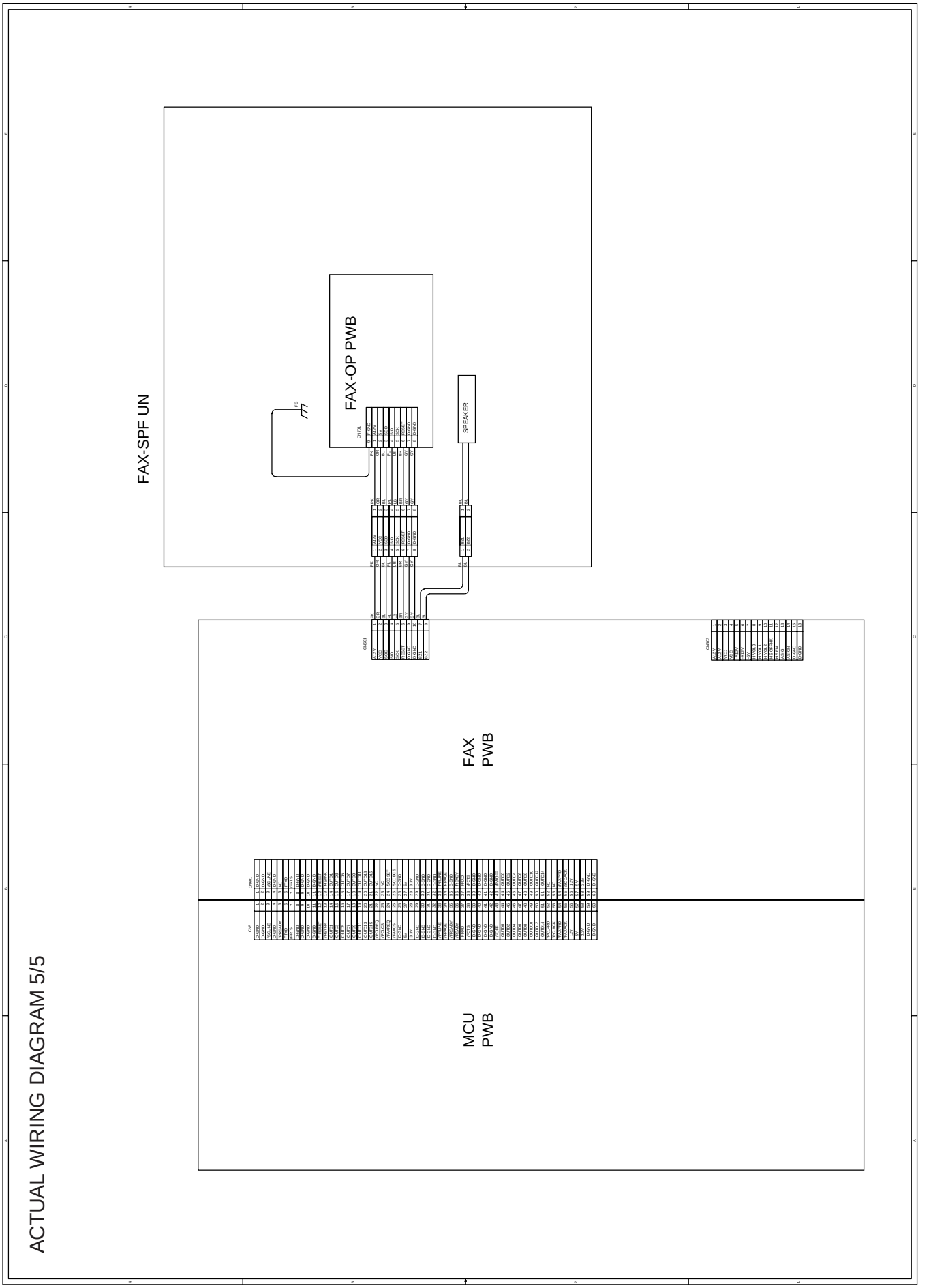
ACTUAL WIRING DIAGRAM 2/5



ACTUAL WIRING DIAGRAM 3/5




ACTUAL WIRING DIAGRAM 4/5
FAX SPF UN
PAPER FEED UNIT
Senser PWB
5 D-GND
4 SDSW
3 SPID
2 SB4D
1 5V
SPUS
SPPD
SPMT
SPMT-1(B)
SPMT-3(/B)
SPMT-2(/A)
SPMT-0(A)
24Vmir
24Vmir
GY
PL
BL
LB
OR
RD
BR
PK
FG
MCU PWB
CN26
3 D-GND
6 SDSW
5 SPID
7 SB4D
8 5V
11 24V
12 /SPUS
1 D-GND
2 SPPD
4 LEDSPPD
19 SPMT-1
20 SPMT-3
21 SPMT-2
22 SPMT-0
23 24Vmir
24 24Vmir
CN31
1 LEDSDOD
2 SDOD
3 D-GND
SDOD


ACTUAL WIRING DIAGRAM 5/5
FAX-SPF UN
FAX-OP PWB
SPEAKER
FAX
PWB
MCU
PWB

CAUTION FOR BATTERY REPLACEMENT

(Danish) ADVARSEL !
Lithiumbatteri – Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri
af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandoren.

(English) Caution !
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type
recommended by the manufacturer.
Dispose of used batteries according to manufacturer's instructions.

(Finnish) VAROITUS
Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan
tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden
mukaisesti.

(French) ATTENTION
Il y a danger d'explosion s' il y a remplacement incorrect
de la batterie. Remplacer uniquement avec une batterie du
même type ou d'un type équivalent recommandé par
le constructeur.
Mettre au rebut les batteries usagées conformément aux
instructions du fabricant.

(Swedish) VARNING
Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent
typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens
instruktion.

(German) Achtung
Explosionsgefahr bei Verwendung inkorrekter Batterien.
Als Ersatzbatterien dürfen nur Batterien vom gleichen Typ oder
vom Hersteller empfohlene Batterien verwendet werden.
Entsorgung der gebrauchten Batterien nur nach den vom
Hersteller angegebenen Anweisungen.

SHARP

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